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COMMONWEALTH OF PENNSYLVANIA



Cabinet for Public Schools.

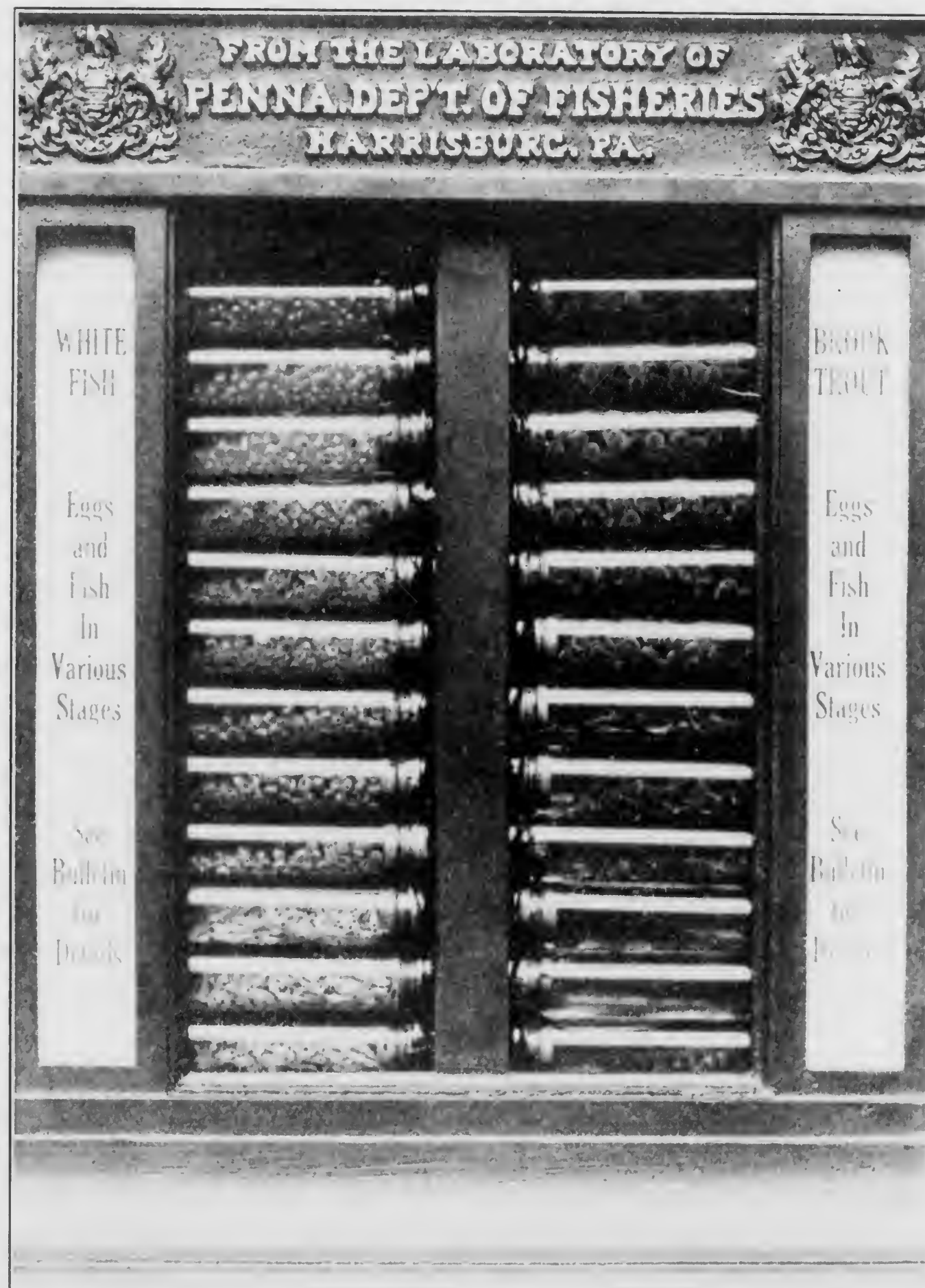
Report of the

Department of Fisheries

From December 1, 1912, to
November 30, 1913

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
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COMMONWEALTH OF PENNSYLVANIA,
DEPARTMENT OF FISHERIES.

COMMISSIONER OF FISHERIES.
N. R. BULLER, Office, Harrisburg.

BOARD OF FISHERY COMMISSIONERS.
JOHN HAMBERGER, Erie.
HENRY C. COX, Wellsboro.
W. A. LEISENRING, Mauch Chunk.
JOHN C. OGDEN, Johnstown.

SUPERINTENDENT OF HATCHERIES.
CORY HATCHERY, No. 1, William Buller, Corry, Pa.
ERIE HATCHERY, No. 2, P. H. Hartman, Erie, Pa.
BELLEFONTE HATCHERY, No. 3, Wm. F. Haas, Bellefonte, Pa.
WAYNE CO. HATCHERY, No. 4, G. W. Buller, Pleasant Mount, Pa.
TORRESDALE HATCHERY, No. 5, J. R. Berkous, Torresdale,
Philadelphia. 53607
ERIE AUXILIARY, No. 6, A. G. Buller, Union City, Pa.

REPORT
OF THE
BOARD OF FISHERY COMMISSION

Hon. John K. Tener, Governor of Pennsylvania:

Sir:—Herewith we have the honor to transmit report of the operations of the Department of Fisheries of Pennsylvania for the year ending November 30, 1913.

Perhaps it is in place here to say that when the Commission made its annual report for 1912 it embodied in it not only the work of the Department, but the plans and purposes it had elaborated for the coming year. It told of the proposed rehabilitation and permanent work at the hatcheries, and stated the requirements in the way of funds that were needed to do this work efficiently and economically. Each separate item was mentioned and the amount of money asked for and the reason therefor, yet the Commission regrets to say that up to this time the report of 1912 has not come from the printer, and consequently none of the information in the report was available for the use of the last legislature in making its appropriations for the two years beginning June 1, 1913, and ending May 31, 1915. This certainly is an unfortunate state of affairs as it left the Legislature without any guide as to the needs of the Department, except, of course, that the Commissioner did present much data, but it was impossible to do so as clearly as it was set forth in the annual report.

As mentioned in the report for 1912 the Department resolved to consolidate the work of the Department to those hatcheries which were best fitted for the work they had to do, and then to proceed to reconstruct the old ponds and build new ones of the most substantial and permanent character, principally with re-enforced concrete and add to this, hatching houses built of concrete and steel, and even the troughs built of the same material, so that decay could no longer set in as in the case of temporary structures. While the work was of such character that while not only being permanent it was at the same time finished in such a manner as to make the ponds and the buildings a credit to this great Commonwealth.

Of course, this work of rebuilding and rehabilitation interfered seriously with the work of fish propagation, yet the Commission is glad to say that the number of fish distributed over the State

(3)



was such that all applicants received fish, though probably not in such large numbers as they would have gotten if the hatcheries had been in full working condition. In another year it is hoped that the work will be so far along that the hatcheries at which it was done will be able to make their full output of fish.

Under the new method of distribution trout, bass, bluegills, catfish and yellow perch were distributed as yearlings varying in length from two to six inches, and this size fish seems to more thoroughly satisfy the recipients, if it is possible to judge from the commendatory replies received from the recipients of fish. Each notice of the shipment of fish contains a blank stating how many fish are sent and their size, and the recipient is asked to return this blank stating how many fish he actually received and in what condition. By means of this blank the Department is able to determine to a greater degree the reason for any fish being received in poor condition, because the name of the messenger is given and he can be held responsible.

The recommendation of the Board that the hatchery at Spruce Creek be abandoned on account of trouble from floods was adopted by the Legislature and the property was sold, realizing within \$100.00 of the price paid by the Department. The hatchery at Conneaut Lake was closed on account of its unfitness for the work, and permission was asked the Legislature to dispose of the same and return the money to the original subscribers. Unfortunately, this act after passing the House of Representatives failed of passage in the Senate.

The question of fishways which fish will go up has received much consideration, especially the one at the dam of the Pennsylvania Water & Power Company in the Susquehanna River at Holtwood. The Cail fishway placed in the dam has proved of no value, and after personal visitation to the place the Commission was of the opinion that a natural water way from the dam down to the river on the York county side would accomplish results better than anything yet devised. The Power Company, at much expense, has installed this fishway and it certainly looks as if it would do the work. Time, however, can only prove this.

The number of dams in the State at present is large, and will constantly increase, owing to the demand for the conservation of energy which is now being allowed to run to waste. There are really only two migratory fishes in the waters of this State—the shad and the eel, and in streams not visited by these fish it seems unnecessary to compel the builders of dams to put in elaborate fishways at much cost, and which necessarily must cause some lack of water.

It is a matter of fact that dams are desirable things in the streams as they form large bodies of water in which larger numbers of fish will thrive than in the ordinary stream. The eel does not need much of a fishway for his road up the stream, and the trout ascending a stream to reach the spawning beds will climb a very primitive sort of a ladder.

The lease of the ground upon which the Torresdale hatchery is situated expired on the 30th of November, and a new lease has been made for 20 years, with the privilege of renewal, from the City of Philadelphia, at the nominal rental of one dollar a year. The Torresdale hatchery is the hatching place for shad, and the work it has

done is of such a character that it will undoubtedly keep the Delaware River stocked with this edible fish, which, without artificial propagation at Torresdale, would become extinct. The Torresdale hatchery is also used for propagating catfish and yellow perch.

The Board regrets that the Legislature did not see its way clear to make an appropriation for warden service that would allow the employment of 30 wardens authorized by law. The Department, under the money allowed, is only able to employ nine wardens and this gives each one so large a territory that it is impossible for him to give it the thorough patrolling that is necessary to round up the violators of the law.

The Board, however, must commend the work done by the wardens as showing them to be a highly efficient body of men, fully awake to their responsibilities. Not only do the wardens have to make examples of the men who violate the laws in taking fish, but they also have to investigate the various sources of pollution along the streams of the State. A commercial agency places the number of manufacturing establishments in Pennsylvania at 48,000, which would give each warden nearly five thousand manufacturers on which he must keep his eye.

While the Board is glad to say that the majority of the manufacturers show an earnest effort to stop pollution, there are many others who are profuse in promises but very dilatory in practice. The Department has, therefore, begun a systematic source of prosecution to convince the manufacturers that the Department is thoroughly determined to enforce the law, while at the same time not to harass the manufacturer unnecessarily. It is striving to clear up one water shed at a time and has now pending over a dozen suits which embrace all the manufactories upon one water shed. Where the manufacturer, after suit is brought, promises to get busy in bringing about the purification of the water, an opportunity is given him by postponing the suit for sixty or ninety days, so that he can show that he is in earnest in his efforts to no longer allow refuse to run into a stream.

The Department has during the year cordially co-operated with other States and with the United States Bureau of Fisheries, the result being that by exchange the Department has been enabled to secure large numbers of white fish eggs from Canada and the United States Bureau of Fisheries, pike perch from these same Departments, and also from the New York Conservation Commission, while from other sources it has obtained lake trout and muskalonge eggs.

Under the law establishing a Department of Fisheries four Commissioners are appointed to act with the salaried Commissioner of Fisheries. There are certain duties prescribed in the law for these Commissioners to do, among them, for instance, being the determination of the question whether streams are trout streams either in part or whole. The law provides that the members of this Commission shall serve without salary, but they shall be allowed their expenses, it being evidently thought that when the citizens of the Commonwealth gratuitously give their time for working for the State they should not be compelled to bear their expenses. Unfortunately, the appropriation made for expenses is not large enough to allow the

Commissioners to meet as often as possible, and hence the performance of their duties is hampered, and consequently some things that should be done are left undone.

Very respectfully,

JOHN HAMBERGER,
HENRY C. COX,
JNO. C. OGDEN,
W. A. LEISENRING.

REPORT OF THE COMMISSIONER OF FISHERIES

Hon. John K. Tener, Governor of Pennsylvania:

Sir:—Herewith I have the honor to transmit the annual report of the Department of Fisheries.

The year has been a busy one, especially since the first of June when the new appropriations became available. The work of rebuilding the ponds interfered in a great measure with the propagation of fish, but the Department is glad to say the output has been a good one and exceeded expectations.

One gratifying thing about the distribution of fish is the returns received from applicants stating the condition in which the fish arrived, and in almost every case the returns show there was little or no loss, while the large majority of the applicants expressed their great satisfaction in the larger size of fish shipped. It is evident that the eye plays a large part with the recipient of fish from the hatchery, and a smaller number of larger size seems to the ordinary person a great advance over shipments of many more fish, but so small as to be barely visible.

Fish culture, like any other business, demands suitable plants and tools to accomplish results, and the department during the year has been actively at work completing the present hatcheries with permanent structures which will result in the least cost for maintenance, and much less work in the case of ponds in keeping them clean. When the plants upon which the Department is now working are carried out to completion, it is hoped that Pennsylvania will have the best equipped hatcheries of any State in the Union, and equal to all the demands made upon them for fish.

The form of application adopted by the Department requires the applicant to fill out the full description of the stream or water it is proposed to stock and thus enable the Commissioner to judge the suitability of the water for the fish applied for. Experience shows that in too many instances the wrong fish are planted, or too many varieties of fish are planted in the same water, and none survive. There are many people who think any fish is merely a fish and any fish ought to live where there is water. For this reason there are hundreds of applications pour into the Department in which the applicants apply for trout, pike-perch and black bass for the same water, which applications, of course, the Department does not fill, but explains to the applicant that black bass are a warm water fish and the brook trout a cold water fish, and water that is suitable for one is entirely unsuited for the other, and it will not live in it. The pike-perch is a very carnivorous fish and should only be planted in large areas of water.

Efficiency and economy are the greatest factors in success in the business world, and they are the greatest factors in the work of the officials that have charge of the fishing industries of the Government

and various States. Efficiency and economy are only attained by the use of the best possible methods and the best contrived plans. It was in view of this that the Department of Fisheries of Pennsylvania decided that the way to get the best results at the least expenditure of money was to concentrate the work at a few plants and make those plants complete in every detail and up to the highest type of the requirements of fish lore.

There were eight hatcheries in Pennsylvania when the present Commissioner assumed control, but one of them at Spruce Creek had been badly torn up by floods, the last flood having left nothing but an almost desolate waste, and another one at Conneaut Lake, which the water supply and the situation unfitted for the work it was called upon to do, so they were both abandoned and the work concentrated upon the other six hatcheries, using each one for the propagation of the fish to which it is peculiarly fitted.

By an act of the last Legislature the Department was authorized to sell the hatchery at Spruce Creek, which was done, the Department realizing within one hundred dollars the amount paid for the property. Considering everything, the price obtained was remarkably good. A bill was also introduced in the Legislature allowing the sale of the property at Conneaut Lake and returning the money to the subscribers who furnished the land to the State. This bill was defeated.

At every one of the six hatcheries retained, engineers and architects were engaged to draw plans showing the best way that every hatchery could be rebuilt and rehabilitated, so as to obtain the highest possible results. The ponds are all to be made of concrete and the hatching houses of brick, concrete and steel, with an absence of wood, that will make them almost indestructible and not requiring almost constant repairs. The dignity of the Commonwealth of Pennsylvania demands that all the structures shall be of the most substantial and ornamental type that will make them a credit to the Commonwealth in the way of ornament as well as the necessary adjuncts to the propagation of fish.

While the Department has perfected its plans to furnish all the game fish that are required to stock the streams of the State, yet it knows that the number of anglers who want these fish is but a small proportion to those who go fishing in the State. To the expert angler with his slight tackle there is a thrill goes through him when the gorgeous colored trout or the greedy black bass take his fly and starts to battle for freedom.

But the number of trout streams is but a small portion of all the streams in the Commonwealth, while the black bass is not suitable for many streams or waters. To the bulk of the dwellers in Pennsylvania fishing is not only an amusement but at the same time fishing is a means of obtaining food supply. There is nothing equal to a day or a week in the woods beside a stream where the sun brings the tan to the cheek, and the fresh air a joy to the lungs that is not felt by the dwellers in towns who work in stores and mills, and the farmer's boy, and even his wife and daughters enjoy a fishing trip to the streams where they can secure a mess of fresh fish, which means a change of diet, and at the same time as they hook the fish with their plain tackle, they feel as exciting a thrill and it is as gratifying to them as to the angler who takes the trout or bass.

To this very large majority of fishermen the joy of fishing is brought by the so-called minor fish, the yellow perch, the sunfish and the catfish, together with such native fishes as the chub and the fall fish. All these fish are easily propagated and have great fecundity, and the Department will bend every effort to produce these in such large numbers that every one cannot only have the delights of fishing, but the pleasure of taking home a string of fish to eat.

There would be no difficulty in keeping the streams and lakes stocked with fish, but for the wasteful and destructive methods employed by too many persons who have no regards for the rights of others. The men who draw off a dam for the sake of getting a bushel of fish and thereby destroy thousands of small fish, are men who have no regard for the Golden Rule. The same is true of the gigger and the seiner, but the Department hopes with the education of the people to the fact that the streams can be filled with fish if they are properly protected, that the days of destructive fishing will soon be numbered.

The Department is glad to say that it finds no part of its work so popular as the plan to stock the streams with the fish for the general public. Any one who goes along the stream and sees a family party fishing will know that the returning fisherman to camp is hailed with joy and shouts, as he waves in the air a string of fish that the trout fisherman would look upon with scorn, yet the trout fisherman with his creel full of speckled beauties experiences no more joy than the less expert angler does over the trophies of his rod and line.

Upon the Department devolves the important work of the conservation of a most valuable food supply, and in addition the promotion of the popular recreation of angling by providing fish. The fact that the average person does not understand fully the matter of planting fish gives incidentally trouble for the Commissioner. It is hard to make some people understand that because there is water on his place, therefore the Department of Fisheries should furnish him with fish of every kind that the Department propagates. But the Department is gradually teaching the public that certain waters are better for some varieties of fish than others for exactly the same reason that some plants thrive better in one locality than another, on account of the difference in the soil and climate, while in the fish case much depends upon the temperature of the water and the character of the stream.

Angling has been described by a Satirist as a pole and line with a worm at one end and a fool at the other, but that man was evidently one of those people whose milk of human kindness had curdled. There is no more health giving occupation than a day or two days spent on the banks of a stream or lake where the pure air fills the lungs, brings new life to the blood and clearing the cobwebs that have gathered in the brain during the days of toil. In the reflection of the clouds in the water the fisherman sees air-castles that seem to be filled with light and gaiety and looking at these bright pictures he forgets the sordid cares of his ordinary life. There are hundreds, nay thousands, of lovely spots in Pennsylvania which lure the angler, and while he is communing with Nature, well stocked streams will enable him to fill his creel.

The streams and waters of the State belong to the people, and in the early days of the Commonwealth there was rarely an objection

to the angler pursuing his sport, but of late years there has grown up a disposition on the part of some people to make reservations from which the public are excluded. All the laws passed by the Legislature have been against this policy of closing the streams, and the Department of Fisheries is fully in accord with the laws. In some sections of the State the money spent by visiting fishermen is a large source of income to the dwellers of those sections. In fact in some sections it is almost the entire source of income. In Maine the money received from visiting fishermen runs into millions of dollars annually.

Part of this disposition to close streams to the fishermen is caused by the heedless fisherman who pays no regard to the rights of the land owners. He breaks down fences and tramples down crops with utter disregard to the farmer. On account of these few inconsiderate people the many have to suffer. Taet and a show of consideration will, however, bring about a better state of feeling, and with the angler and the farmer working in amity there is no question that the result will be a good one for both.

One of the pleasantest duties that devolves upon a Commissioner of Fisheries is that of meeting face to face those citizens of the Commonwealth who are interested in fishing. The duties of the Fish Commissioner are little understood by the majority of the people who cannot realize how multifarious and diversified they are. Office work is really the least part of them as that generally can be performed by the office force, of which fortunately this Commissioner has an efficient one. He must exercise supervision over the various hatcheries of the State and see to it that each is worked in the most efficient and economical manner.

He must see that enough fish are raised to restock the streams with fish, and at the same time he must have supervision over the wardens upon whom devolves the duty of enforcing the fish laws. Unfortunately, the warden duty is badly hampered from the fact that the Legislature only appropriated enough money to pay ten wardens to cover the whole State, and this gives each one a very large territory and renders it impossible for him to do full justice. The fact is that the duty of enforcing the fish laws should be given over to the Department of State Police, and this could readily be done by increasing that force by another troop which would replace the wardens now employed by the Department.

Many people claim that there is not as many fish now as there were fifty years ago when there were no fish laws. Such complainants forget that half a century ago there was not one fisherman where there are now one hundred, and there was not one destructive device where there are now one hundred, to which must be added the fact that during that half century the pollution of the streams has enormously increased.

The Department is working earnestly to bring about the abolition of all wasteful and destructive methods of fishing, and it is glad to say that during the last session of the Legislature an act was passed abolishing fish baskets as a method of taking fish. The fish basket is an extremely destructive method and in spite of all the fish basket men say there were more other fish taken and killed than there were eels.

The personal meeting with the people of the Commonwealth brings about a closer touch between the Department of Fisheries and the people than any other method. It enables the Commissioner to explain the knotty points of fish culture and the necessities in the way of pure streams and restocking by which a supply of fish will be obtained. The audiences are able to have answered questions on what to them have been obscure matters and have the problems explained in a way that they see clearly the object to be attained. These meetings have therefore resulted in the dissemination of information far better than by printed words, and from the growing interest taken in the planting of fish and the purification of waters, the Department feels that public sentiment is growing constantly towards the aim striven for by the Department; that is pure water and plenty of fish in it.

At the last session of the Legislature a law was enacted in regard to fishing in Lake Erie, which is extremely important. It increased the size of the mesh of nets so that it allows to pass through the twine large numbers of fish heretofore taken at entirely too young a stage. These smaller fish now have a chance to become mature and spawn. The small fish heretofore taken were not wanted by the fish houses and many of them were allowed to go to waste.

There are quite a number of fishermen who would like to see the mesh of the nets increased still more. The act also prevents the nets being attached to the shore, thereby no longer interfering with the black bass on their beds. The act requires a mesh for gill nets of not less than three inches stretched mesh fishing measure, which means that the meshes shall not measure less than that when fishing, and fishermen are required to make an allowance for the shrinking of the mesh when tarred.

Few persons realize the immense importance of the fisheries of Lake Erie and the amount of money invested in these fishing interests in the port of Erie, which is the largest fresh water fish market in the country. Conservation means much to these fishermen and they realize that the destruction of fish before they have become mature enough to spawn is simply a waste, and if continued, would do much in the way of the depletion of the fish supply of the lake.

It might be well to say in this connection that but for the work of the Department all these millions of eggs from the fish taken in Lake Erie would be lost, so that it can readily be seen what it means for the food supply by the preservation of so many million eggs and hatching them so that their yield can be planted to grow up in the lake. The fish that these eggs are taken from would not spawn naturally, and therefore but for the spawntakers of the Department the eggs would be an entire loss.

As showing what has been done in the conservation of this waste product the Superintendent of the hatchery at Erie reports that during the year 1913, owing to circumstances, the take of white fish eggs from Port Clinton, Ohio, and from Canada was comparatively small, the number received from Port Clinton being 42,912,000, and from Canada 3,888,000. He therefore turned his attention to taking herring eggs, the herring being relatively the most important source of the fish supply at Erie. The result was that by active work there were gathered 173,821,000 herring eggs. Every egg of these would have been lost but for this work.

The Department is convinced that considering the size of the lakes and streams in Pennsylvania that it is absolutely necessary, if the supply of fish be kept up, the destructive devices must be prohibited by law, and the very best thing that could be done would be to restrict the taking of all fish in the interior waters of the Commonwealth to rod, hook and line. If this were done there is no doubt that when anybody went fishing he would be certain to take a mess of fish.

The Department had hoped to get such a bill through the last Legislature, but a little experience with the temper of that Legislature soon carried conviction that it was better to let well enough alone and leave the fish laws as they stand upon the books. It is rather curious that when a bill was introduced in the House of Representatives to allow gigging in all the streams of the State, including trout streams and at all seasons of the year, it went through with an overwhelming majority but fell in the Senate from lack of consideration. Experience has shown in various parts of the State that so devastating and thorough in their work are the giggers that not a fish remains in the streams where they pursued their work relentlessly.

Yet, strange it may appear, but when a bill was introduced to abolish the fish basket, that bill went through without scarcely an objection.

Back in 1897 the Board of Fisheries Commission, which preceded this Department, purchased a fish car which was equipped up to the standard ideas of a fish car at that time. It was used for some years and then it was shunted on to a railroad siding at St. Mary's where it remained exposed to the inclemency of the weather, and evidently was used as a tramp lodging house, the lodgers carrying off everything that was not fastened so tightly that they could not cut it loose.

At the time of the St. Louis Exposition the car was sent to the shop and completely overhauled at the price of \$1,500.00. A car barn was built at the Bellefonte hatchery and the car stored there. It was used on several occasions but the railroad companies complained of the equipment, such as the air brakes, and every time the car was moved there was a bill for repairs, each railroad seeming to demand a different style of appliance from the one it was just delivered from.

The car has now become so dilapidated that no railroad would haul it without its being thoroughly overhauled, and to overhaul it would cost nearly as much as a new car, and then the Department would have nothing but an old second hand car anyhow. It is proposed to sell this car and save the annual payment of insurance. The time may come when a car will be absolutely necessary for the Department's use, but when that time comes the car must be up-to-date in every particular so that it will not be a menace to any train it is attached to on the railroad.

The reports from the Superintendents of the various hatcheries show that they did remarkably good work considering the disadvantages they labored under, for propagating fish in the midst of a lot of repair gangs is a very difficult proposition.

The Erie hatchery having been thrown out of use so far as hatching eggs was concerned, owing to the treatment of the water supplied to the city of Erie, the Superintendent was kept busy at field work,

and the result was that he gathered 220,621,000 eggs, and 15,359 fish for distribution. A new hatching house on the lake shore will be completed and ready for use before the next hatching work sets in, and the Department feels sure that in this complete structure it will be able to do much and better work than was ever done before.

The Erie Auxiliary at Union City was in considerable trouble due to a wash-out by a flood early in the spring which swept away the pipe carrying the water supply to the hatchery, which hatchery was full of eggs at the time, but fortunately they were nearly all ready to hatch and were hurried to Lake Erie where they were planted. Most of the eggs, it is gratifying to say, were hatched out before the planting took place. The output of fish as shown by the Superintendent's report was very good, considering all the difficulties with which the propagation was surrounded.

At Bellefonte a number of new ponds were built and others re-walled. The water supply for a number of ponds has been unsatisfactory owing to the fact that the water was taken from the Logan Branch and was almost always roily. This has been entirely obviated by the laying of a pipe from the Shugart Spring to the ponds, so that an ample supply of clear water is assured. Brown trout breeders are being added to this hatchery so as to enable the Department to keep up with the demand for brown trout, which is becoming larger every year. Nearly half a million brook trout yearlings were distributed, and there are enough fish on hand to fill all the applications now on file.

At Corry a large amount of work was done, there being 23 ponds all rebuilt with re-enforced concrete. A new hatching house was also began and it will not only be a credit to the State but ample to furnish all the demands that will be made upon it for some time to come. Here, too, the work of rehabilitation interfered with the work of propagation of fish, so that the output was 395,600 brook trout and 101,500 brown trout, all of which were yearlings.

It is very gratifying to the Department that it has kept up the most cordial intercourse with the other Fish Departments of the country. It has worked hand in hand with the United States Bureau of Fisheries and secured from them such fish as it desired to supplement its own supply. From New York the Department has obtained pike-perch and muscullonge eggs, and in turn has furnished that Department with brook trout and shad. It has also been enabled to secure lake trout eggs from Michigan and Wisconsin, and thus keep up a much needed supply of the lake trout. The Department has made no effort to bring on a feeling of rivalry, but feels that the best thing for all is cordial co-operation.

The following table shows the output of fish during the year:

Adult Yellow Perch,	27,533
Yearling Brook Trout,	848,700
Adult Brook Trout,	220
Adult Brown Trout,	1,260
Adult Rainbow Trout,	20
Lake Trout,	90,000
Wall-eyed Pike Fry,	25,625,000
Adult Pickerel,	1,000
Tadpoles,	214,000

Yearling Brown Trout,	106,500
Brown Trout Eyed Eggs,	15,000
Bluegill Fingerlings,	76,400
Bluegill Yearlings,	2,800
Large Mouth Bass Yearlings,	6
Small Mouth Bass Yearlings,	17,960
Yellow Perch Fry,	19,000,000
Yellow Perch Yearlings,	10,845
Wall-eyed Pike Adults,	590
Muscallonge Fry,	500,000
White Fish Fry,	57,238,500
White Fish Eggs,	422,000
Lake Herring Fry,	3,000,000
Common Sunfish Yearlings,	2,000
Rock Bass Yearlings,	150
Catfish Yearlings,	500
Small Mouth Bass Adults,	609
Bluegills Adults,	150
Yellow Perch Fingerlings,	300
Goldfish Fingerlings,	295
Shad Fry,	23,810,000
Shad Eyed Eggs,	1,000,000
Eels,	50
Goldfish Adults,	12
Catfish Fingerlings,	70,000
Catfish Adults,	300
Calico Bass,	200
Minnows,	8,000

Total, 132,090,900

FINANCIAL STATEMENT.

The following is a statement of the receipts and expenditures of the Department of Fisheries for the year from December 1, 1912, to November 30, 1913:

HATCHERIES.				
Received from State Treasurer,	\$46,525 77			
Balance on hand Dec. 1, 1912,	594 78	\$47,120 55		
Paid for hatcheries,			\$47,110 24	\$10 31
Balance on hand Nov. 30, 1913,				
WARDENS.				
Received from State Treasurer,	\$13,620 53			
Balance on hand Dec. 1, 1912,	49 23	\$13,669 76		
Paid for wardens,			\$13,620 53	\$49 23
Balance on hand Nov. 30, 1913,				
CONTINGENT EXPENSES.				
Received from State Treasurer,	\$1,600 00			
Balance on hand Dec. 1, 1912,	138 59	\$1,138 59		
Paid for contingent expenses,			\$1,092 73	\$15 86
Balance on hand Nov. 30, 1913,				
EXPENSES OF FISHERY COMMISSION.				
Received from State Treasurer,	\$1,120 41			
Paid for expenses,			\$1,120 41	
COUNSEL FEES AND COURT EXPENSES.				
Received from State Treasurer,	\$770 84			
Paid for fees and expenses,			\$770 84	
OPERATING LAUNCH.				
Received from State Treasurer,	\$4,403 23			
Paid for operating,				\$1,403 23
COMPLETING HATCHERIES.				
Received from State Treasurer,	\$26,464 40			
Paid for work,				\$26,464 40
FIELD WORK.				
Received from State Treasurer,	\$2,002 98			
Paid for work,				\$2,002 98
FISHWAYS.				
Received from State Treasurer,	\$4,882 17			
Paid,				\$4,882 17
REPAIRS TO LAUNCH.				
Received from State Treasurer,	\$188 25			
Paid for repairs,				\$188 25
NEW HATCHERY AT ERIE.				
Received from State Treasurer,	\$5,124 17			
Paid on contract,				\$5,124 17
PRESQUE ISLE PENINSULA.				
Received from State Treasurer,	\$8 25			
Paid for labor,				\$8 25
BOAT FOR TORRESDALE HATCHERY.				
Received from State Treasurer,	\$1,500 00			
Paid for boat,				\$1,500 00
REPAIRS TO FISHWAYS.				
Received from State Treasurer,	\$103 54			
Paid for repairs,				\$103 54

The following moneys were paid to the State Treasurer during the year being derived from the following sources:

Commercial hatchery licenses,	\$ 130 00
Fines for violation of the fish laws,	3,672 65
Seine licenses,	45 80
Tidewater seine licenses,	4 00
Lake Erie licenses,	2,354 00
Eel basket licenses,	2 85
Confiscated property sold,	26 00
Spruce Creek hatchery,	3,050 00
Return insurance premiums,	11 80
Total,	\$9,297 10

ITEMIZED EXPENSES OF HATCHERIES.

The following table shows the itemized expenses of each hatchery for the year from December 1, 1912, to November 30, 1913:

	Salaries.	Labor.	Travel.	Material.	Food.	Incidentals.	Total.
Bellefonte,	\$3,210 00	\$943 27	\$1,789 99	\$1,315 18	\$1,066 35	\$829 06	\$9,153 85
Corry,	3,670 50	1,927 30	1,034 43	4,828 36	733 73	468 86	12,663 18
Crawford,	440 00	3 50	5 20	40 99	42 40	122 56	654 65
Erie,	1,620 00	496 85	437 96	133 26	166 78	125 95	2,980 80
Erie Auxiliary,	3,120 17	1,196 81	671 24	950 46	22 72	344 58	6,335 98
Spruce Creek,	260 00	5 09	4 24	14 19	.....	6 00	289 52
Torresdale,	3,163 44	1,027 85	415 17	1,686 54	145 73	904 73	7,313 46
Wayne,	2,934 08	859 80	658 64	1,722 22	164 24	806 99	7,145 97
	\$18,418 19	\$6,460 47	\$5,016 87	\$10,721 20	\$2,341 95	\$3,008 73	\$46,567 41
Miscellaneous, .....	.....	.....	.....	.....	.....	.....	542 83
Total, .....	.....	.....	.....	.....	.....	.....	\$47,110 24

SHAD SEINE LICENSES.

During the season 22 licenses were issued and the licensees reported a take of 24,008 shad, valued at \$7,325.81. Other food fish taken were valued at \$141.70, making a total for all fish caught \$7,467.51. No shad ascended above McCall's Ferry dam. This return does not give nearly the value of the fish taken, as very large quantities of shad

were taken below the McCall's Ferry dam in the Susquehanna. Next season will test the efficiency of the new fish way in the Susquehanna at McCall's Ferry dam.

County.	Shad.		Suckers.		Carp.	
	Number.	Value.	Pounds.	Value.	Pounds.	Value.
Bucks,	1960	\$652 60	1260	\$81 30	80	\$6.40
Laurel,	8197	1,724 00	.....	.....	400	40 00
Millin,*	3715	1,300 25	.....	.....	.....	.....
Perry, .....	.....	.....	110	4 00	.....	.....
York,	10,836	3,647 96	.....	.....	200	10 00
	21,008	\$7,325 81	1,370	\$85 30	680	\$56 40

*The Millin County license was fished in the Susquehanna River below McCall's Ferry Dam.

LAKE ERIE FISH INDUSTRY.

While the Commonwealth of Pennsylvania has only 40 miles of shore line on Lake Erie, the port of Erie is the largest fresh water fish market in the world. The amount of nets that are set every day run into hundreds of miles and the production of fish last year was 2,910,741 pounds, valued at wholesale at \$509,502.09. These are astonishing figures and convey forcibly the value of the fish business in Lake Erie, where the city of Erie is only one of a number of fishing ports. The value of the boats and tackle used in taking the fish and the warehouses where they are handled runs into millions of dollars and gives employment to hundreds of men.

The most remarkable thing, however, in this matter and one in which the Pennsylvania Department of Fisheries takes pride is the fact that all this immense business is due to the artificial propagation of fish by this department and the United States Government and other States, and the whole restocking is done by the saving of the eggs which would be a waste product if it were not for the work of the hatchery men. There is not the slightest question in the minds of any fisherman as to the value of the work done by the Pennsylvania Department of Fisheries in this matter, because it was not many years ago, before the artificial propagation was taken up, that the catch of fish had so fallen off that the pursuit of fishing was no longer profitable.

The figures given above do not convey entirely the immensity of the business because they show the wholesale prices and the persons who use this large supply pay from 50 to 100 per cent. advance on these figures on account of freight and the handling by the fish dealers at their respective homes. Taken altogether the fish industry at Erie

is a most valuable object lesson as to the value of artificial propagation of fish in furnishing a very important food supply to the people. If Lake Erie with the tremendous drain made upon it by the fishermen can be kept stocked with fish, it shows that the other lakes and streams in Pennsylvania can also be restored to their former productiveness, if the hatcheries are worked to their full capacity and the fishermen observe the laws against wasteful and destructive methods of fishing.

	Pounds.	Value.
Clisco or Lake herring,	1,012,518	\$351,449 71
Lake trout,	158,286	8,469 60
Yellow perch,	88,387	4,467 43
White fish,	349,198	31,321 92
Miscellaneous,	68,545	2,049 47
Catfish,	2,179	228 81
Pike perch,	9,043	950 81
Blue pike,	1,117,019	103,345 07
Carp,	102,699	2,641 86
Sturgeon,	7,877	1,567 41
Total,	2,910,741	\$509,502 09

COMMERCIAL HATCHERIES.

One of the industries which have grown up in Pennsylvania in recent years is that of commercial hatcheries where fish are bred for the market. To encourage these the Legislature passed a law allowing the operator of a commercial hatchery to sell his fish at any time of the year, and this has been taken advantage of principally by the trout culturist, there being several very extensive and successful trout hatcheries in the State.

The law in Pennsylvania allows the operator of a private hatchery, on the payment of ten dollars license fee, to sell his fish or their spawn at any time of the year, the fish being accompanied by an invoice and showing the number of the hatchery and the number and weight of the fish, which invoice is good for six days.

The plan has been found to work well as the hatcheries are open at all times to the Department and if they should supplement their own trout with wild trout taken surreptitiously, the fact would be developed by the known capacity of the hatchery. There have been one or two cases where persons have tried to violate the law by supplementing their hatchery fish with wild trout, but the business was comparatively small and the risk was not worthy the gain.

In New York a different system has been adopted and that is that every trout sold from a private hatchery must be tagged with a machine furnished by the Department of New York. New York charges three cents per tag, which are furnished by the Department to the hatchery, and in addition the machine to attach the tags must be purchased. As the bulk of the trout sold from the hatchery usually take four trout to make a pound, it will be seen that it is a heavy tax

of twelve cents upon each pound of trout sold. This, in a way, reduces the market of the Pennsylvania hatchery man so far as the New York market is concerned, but the New York people look on it as a benefit, as it keeps outsiders from invading the New York market, and possibly reducing the price below what the New York man can get, if he has no outside rivals.

Pennsylvania has always pursued the policy of not taxing the manufacturer, as it believes it is the proper spirit in regard to the trout hatchery who is virtually manufacturing fish for the use of the public, and ought to be encouraged the same as any other manufacturer.

There were 13 licenses issued during the year 1913 for commercial fish hatcheries. These hatcheries did a business of \$63,819.53. This is almost double the amount of business done in the year 1910, which shows an exceedingly gratifying increase. The following table shows the output of the hatcheries:

	Pounds.	Number.	Value.
Dead trout for market,	53,309 1	15,313	\$25,982 24
Trout, live, mature,		188,927	26,079 76
Brook trout, fingerlings,		2,535	180 00
Brook trout, advanced fry,		105,000	359 33
Brook trout, eyed eggs,		20,570,092	9,374 35
Brook trout, green eggs,		4,628,000	930 60
Black bass, fry,		2,500	50 00
Black bass, fingerlings,		15,700	324 00
Smilish,		5,525	151 85
Goldfish,		9,825	301 90
Miscellaneous,		650	55 00
			\$63,819 53

WARDENS.

While the Department believes that it could best do its work if it was confined to its proper sphere—the propagation of fish and the restocking of the waters with those fish, yet the Legislature in its wisdom has seen fit to make part of the duties of the office, the enforcement of the fish laws, and gave to it a force of wardens to do the duty.

Under the act of May 1, 1909, the number of wardens authorized by law is 30, but the Legislature has never appropriated more than enough money to pay for ten wardens. As there are forty-six thousand square miles in the Commonwealth of Pennsylvania, this gives to each warden, if assigned to a district, a very large territory to cover, and one which it is impossible for him to patrol thoroughly. The result has been that the Department has not exactly confined the wardens to a district but has sent them to the sections where their services appeared to be imperatively needed. This means a very large expense account, much heavier in proportion than it would be if the Department had at its control the whole force authorized by law.

It is due to the wardens to say that in view of the large extent of territory they had to cover that they have done their work in a most efficient and satisfactory manner. A better solution to the warden problem would be to turn over the enforcement of the fish laws to the State Police Department, which is organized for the purpose of enforcing all the laws on the Statute Book, and this could be accomplished by giving to the Police Department the increased number of men authorized by the fish laws and a sufficient appropriation to pay them.

The position of fish warden is one that requires tact, good humor, energy and sound physical condition. He must conduct a suit before a magistrate in such manner as to bring out all the points of the case, and he must then see to it that the docket of the magistrate will stand the scrutiny of a court of record, because, unfortunately, so many of the justices of the peace fail to make up their docket as the law requires. To these requirements he must add a thorough disregard for hours and weather, because the professional fish pirate works usually at night, like the burglar, and weather does not deter him when he goes on his lawless errand.

If the Department had its full quota of wardens it would be possible for the men to hunt in couples, and better and surer results would be attained by this. As one warden remarked: "You wade out to three or four men gigging, have a battle with them in which possibly you get a ducking, and then before the 'Squire the three or four violators of the law enter their story against the story of the warden, and as some 'Squires count the number of witnesses rather than their character, the warden is apt to fail in his case."

In pollution cases it is especially true, and the warden should have a witness when he takes specimens of the pollution from a manufactory, because when the polluted water is shown to the 'Squire, the violator of the law sets up a defense that that did not come from his place because he is merely letting out refuse upon which fish thrive rather than are killed.

ARRESTS.

There were 227 arrests made during the year and the fines imposed amounted to \$5,570. A number of cases were appealed, the appeals still pending, and in a few cases the defendants were sent to jail in default of payment of fines. The falling off in the number of arrests is due to a better observance of the fish laws and the tact of the wardens in discriminating between purely technical offenses by innocent violators and the acts of the regular law breakers. The following shows the different violations of the law:

Dynamiting fish,	7
Fishing with seine nets illegally,	15
Illegal dip nets,	29
Illegal fyke nets,	2
Fishing with nets in trout streams,	15

Spearing fish out of season,	28
Taking short trout,	5
Taking short bass,	9
Taking short pickerel,	3
Taking game fish out of season,	28
Fishing with lay-out lines,	7
Taking fish with the hands,	3
Shooting fish,	3
Carrying fish illegally caught,	1
Drawing off waters for fishing purposes,	3
Fishing on Sunday,	24
Illegal fish baskets,	3
Pollution of streams,	35
Using illegal devices not specified,	2
Excessive hand lines,	4
Net with wingwalls,	5
Floats,	2
Stir nets,	4
Trap nets,	6
Looping,	3
Stunning fish through ice,	4

Total, 227

There were 13 acquittals and 20 violators got jail sentences.

POLLUTION.

With the completion and rehabilitation of the hatcheries the Department is confident that it will be able to supply all the demands upon it for the stocking of the streams and waters of the State with fish. Artificial propagation so improves upon nature that the question of a supply is only conditional with the amount of facilities possessed to propagate the fish. This part of the problem of furnishing the people of the Commonwealth with fish for food and fish for the sport of the angler being settled, the next important question is the water in which the fish are to be placed and in which they are to grow up to an edible size. Pennsylvania is blessed with lakes and streams that will sustain enormous quantities of fish life, if the streams are kept in a suitable condition, but unfortunately the waters of the Commonwealth now present a knotty problem as to how about bringing them back to their former pure state.

The first settlers located along the streams at first, because they were highways, and transportation by water was the easiest and cheapest method. With more improved methods of transportation the streams were abandoned generally as highways, for, unfortunately, most Pennsylvania streams are too rapid and shallow to be adapted to transportation. Then as the water ran down to the sea it was the easiest plan to dispose of refuse to run it into the run-

ning stream. That got rid of it for the man up the stream and he reckoned little or not at all upon the man who was to use the water lower down. The result of this has been that a large majority of the streams in the State have become nothing but open sewers, in many of which the water is so foul that it cannot be used for potable purposes or for the watering of stock, while the pollution is so great that fish and fish life will no longer exist in it. To plant fish so that they will grow and thrive requires that the waters of the Commonwealth be in that condition which nature demands for fish life and for the growth of aquatic plants which furnish the garden for the use of the fish.

In the eastern part of the State the people have the Schuylkill river as an example of a very much foul stream, and Chester and Brandywine creeks are fair examples of what a lot of manufacturers can do if they turn their effluent into the stream. In the center of the State the Susquehanna river, has shown on occasions, thousands of dead fish poisoned by the waste of the careless manufacturer, and in the western part of the State some of the streams are so defiled that they corrode the bottoms of the boats that float upon them and the water eats up the tubes of the boilers.

The law declares that it is a criminal offense to run a number of named substances, such as dye stuff, coal or gas tar, coal oil, sawdust, tan bark, lime, vitriol, refuse from gas houses, into the stream, and then adds "or allow to run or flow into a stream any deleterious, destructive or poisonous substances of any kind or character."

This is extremely broad and covers the matter of pollution completely. It is not merely that the deleterious substances should kill fish, but also that it forms a coating upon the bottom of the stream which chokes the vegetation and therefore there is no chance for any fish food to grow.

For two years the Department has had a small force of wardens at its command serving notices on the various manufacturers of the State, calling their attention to the law and the necessity of abating the nuisance. These notices have been supplemented with articles in the newspapers, and there is really no reason that any one should be ignorant of the law. The fact is that many of them know the value of the law from the fact that the water comes to them from above so polluted that it is necessary for them to put in expensive purifying plants so that they can use the water. It is not a case of the old fable of the wolf and the lamb where the water ran from the wolf to the lamb.

Moral suasion has induced many concerns to set about installing plants which will bring about the purity of the water, but the Department has found that few seem to realize that these plants must be of a permanent character, so that under no circumstances can the poison reach the water. There is no permanent improvement in a plan that purifies the water for a space of time and then an accident occurs allowing enough poison to run into a stream to kill all the fish in that stream for several miles, and to restore that stream to its same fish supplied condition as before the accident, will probably take three or four years. There is an old saying that accidents will happen in the best of families, but there is no reason whatever for an accident which will allow the pollution to escape from a manufactory and sweep away several years' work in stocking the stream with fish.

The Department at various times has brought suit against flagrant cases of pollution, but apparently these sporadic cases have had little influence in deterring other manufacturers from running the risk of getting rid of their refuse in the quickest and cheapest way; that is turning it into a stream.

Acting upon a suggestion of the Governor, the Department took up one water shed, the Sinnemahoning, emptying into the Susquehanna river at Driftwood. Every manufacturer along the stream was visited and the operators notified they must take care of their refuse. A year elapsed after these notices, and the Department found that virtually the same conditions remained, so when in September a sudden rush of pollution lined the Susquehanna river from Driftwood to Milton with dead fish, the Department decided that something more drastic than notices must be attempted. It therefore directed suits to be brought against every manufacturer along the Sinnemahoning, a paper mill at Lock Haven and five concerns at Williamsport. In the case of the Lock Haven concern where nothing was done after the first prosecution, but rather the Department was defied and more refuse allowed to run into the stream, a second suit was brought. The Lock Haven manufacturer was convicted before the magistrate, but has been granted an appeal by the Court of Quarter Sessions, which appeal does not come up for hearing until January. The other cases are yet to be tried, and the Department intends to push them to the limit.

The Department fully appreciates the fact that to put in clarification plants requires money and has no desire whatever to harass the manufacturers unnecessarily, but the rights of the people in the lower stream are paramount, and the Department will insist that they have their rights to pure water. The collection of fines is no part of the object of the Department, and where the manufacturer will show that he has put in such a plant that no longer the pollution can reach the stream, the Department will be satisfied and withdraw the charge.

That the manufacturers are fully aware of the fact that their refuse is detrimental is shown in many ways. At Emporium, for instance, the water used from the Sinnemahoning by the iron company was so polluted that it destroyed the tubes in the boilers, and the iron company brought a suit for damages, which was settled, and the offending company put in a pipe which would give the iron company pure water from the stream above the plant running the refuse into the stream.

The Department brought suit against a Montgomery county concern which was running lime into the Schuylkill river, and lime is one of the constituents mentioned in the act as not to be run into the stream. The magistrate found the person guilty, but on an appeal the court of Montgomery county decided from the testimony of a chemist, that when the lime reached the Schuylkill river the volume of water in the Schuylkill so modified this refuse that it made it innocent lime water such as is used to temper the milk of babies. Yet this lime deposits on the bottom of the river a white scum that completely chokes the growth of any aquatic plants, and the longer this is run into a stream the more of the bottom of the river does it cover.

But this one factory is not the only one by long odds running refuse into the stream, and each one adds its mite to the pollution of the

river until the combination is fierce, but under the ruling of the Montgomery County Court no prosecution against a single manufacturer would hold because the amount of stuff it adds to the river, if the river was absolutely pure, would be soon rendered innocuous. It is for this reason that the Department has made the sweeping prosecutions along one stream so that it can show the combined effects of a number of manufacturers defiling a stream. One manufacturer complained bitterly of the expense he was put to to purify the water in the stream which had been polluted by concerns above him, yet that same manufacturer turns that purified water back into the stream fouled worse than before by the combination of poisons he places in it.

Under the provision of the law as passed by the last Legislature, extensive powers for the prevention of the pollution of water has been extended to the Water Supply Commission and the Highway Department, and the Department of Fisheries intends to co-operate with those two departments as it has been co-operating with the Department of Health. In the Highway Department in one case where a bridge is built across the stream, the culm from a mine washed down completely blocking the bridge and diverting the flow of the stream so that the bridge now extends over dry land with the stream running to one side of it.

It has taken time to educate the public to appreciate the value of pure water. Municipalities are spending millions of dollars for filtration plants, much of which could have been saved if the public had insisted upon the clarification of the streams. More millions are spent by the manufacturers in purifying the waters of the foul streams so that they can use them, yet if every manufacturer had taken the pains to purify the water when it left his property he would have been at no more expense than he is now in purifying the water for his own use, and he would be treating his neighbors as he wants his neighbors to treat him.

The Department regrets to say that while the majority of the manufacturers are willing to co-operate, yet there are some who while they do not openly defy the law, resort to sinister ways to evade it. It has found manufacturers who ostensibly are treating their water, yet have a secret outlet through which on occasions they turn their waste poisons into the stream hoping to escape detection. When the Department first started this crusade for pure water it found much difficulty in obtaining assistance from the neighbors of the manufacturer. Those neighbors seemed to think that it would be unneighborly to call attention to pollution that they knew of, but always insisted that the Department should go higher up the stream to prosecute someone who was to them a stranger. Daily pollution of the streams was reported, but in examination disclosed the fact that not a single witness had taken the trouble to secure samples of the water and specimens of the dead fish that the Department might have some aid in ferreting out the trouble. With the small force of 10 wardens to cover the State this made the work of finding out violators very difficult, as when the reports came in it was possible there was not a warden within 100 miles of the place, and by the time he reached the spot there was nothing to indicate what had caused the trouble, and it required much hard work to trace the pollution to its source. This difficulty was met by taking, as mentioned above, one water shed, and by watching it closely, finding the offenders.

It is an old axiom that dirt is matter out of place and that is an exact definition of pollution. There is not a single effluent running from a manufactory but what has an economic value if it could be saved. Possibly in some cases the cost of reducing this pollution to a useful condition would be almost prohibitory, but that is no reason why the pollution should be run down upon a man lower down the stream and render the water in that stream unfit for his uses. He bought his property with the idea that the stream might furnish him with water for the use of his family and for his stock, and he is certainly an aggrieved party if he finds that this suppositious pure water is a delusion. When the water in a stream burns the hair off the cattle's legs and brings on blood poisoning in the man who wades the stream, it matters little to that man what the chemical compositions of the water are, because he knows that it is deleterious from the fact of the damage done, as above stated.

The Department does not intend in the conduct of its suits to depend upon the testimony of the chemist who will certify that various constituents are to be found in the water, and then have that testimony combated by an expert chemist for the defense who will show, as in the Montgomery county case, that if sufficiently diluted the chemicals found by the first chemist will be rendered innocuous. It is small satisfaction to a man who should drink nitric acid and burn out his stomach to know that if that nitric acid had mingled with large quantities of pure water it would have been absolutely innocuous and not hurt him. The same is true in regard to the man whose cattle have their hair burned off their legs by some effluent from a manufactory, which if diluted sufficiently would have been harmless.

The Department bases its contention upon the fact that an effluent pouring from a manufactory will kill fish, or it will deposit such an amount of sediment upon the bottom of the streams that all aquatic life is killed or has no place to root and what should have been the spawning beds of the fish is so covered that the fish will not spawn there. If the Department can show these facts it claims that it has made a case, because it has shown either that the fish are destroyed or their feeding and spawning places are destroyed. If there is no garden in the stream to raise food for the little fish, the little fish will naturally starve to death, and if the spawning places are covered up there will be no eggs laid from which to produce little fish.

There are various substances which flow into a stream that chemically tested would not be poison to the fish, yet these substances if placed in the water will finally drive all the fish away. Thus we may mention sawdust, the lint from pulp mills, although lint will choke up the gills of a fish and smother them to death. Pure water holds three per cent. of oxygen mechanically, and it is on this oxygen that the fish depend for the oxidation of their lungs, and it is possible to have in some waters a still larger percentage of oxygen which is as bad for the fish as too little, the United States Bureau of Fisheries having a hatchery where the water is so highly oxidized that it has to be deoxidized before it can be used for holding the fish, as the extra supply of oxygen brings about a too exhilarating condition in the fish.

Sand is a substance that is not chemically poisonous to fish, and the small mouth bass revels in streams where the water flows over sandy bottoms, yet sand can be washed into a stream in such quantities that it will destroy the stream as a habitat of the bass by filling up all the interstices in the bottom and leaving no place for spawning beds. The chemical reactions are not always to be relied upon as to results in the matter of destructiveness. At powder mills nitric acid is received in iron carboys, yet that same nitric acid, after its use in the manufacture of powder, has some unused portions left and this is run off in the washings and this diluted nitric acid has an extremely corroding effect upon the flues of boilers.

The coal mines are a source of much pollution in their running sulphur water in the streams. There is an old Supreme Court decision which states that coal is a very important factor in the world's work, and to mine coal it is necessary to pump the water from the mines, and until some method is devised to cause water to run up hill, the miners could pump sulphur water into the streams. Since that decision, however, there has been a great change in public sentiment in regard to pure water in streams, and this sentiment is felt by the Court and the Courts are ruling that the welfare of the public is paramount to private use.

Some years ago the United States Geological Survey published a bulletin in which it stated that the water in the Susquehanna river was of the purest quality, because the sulphuric acid in the mine water combined with and destroyed the virulent effect of the sewage and was then itself neutralized by the lime stone in the bottom of the river. It is difficult to convince a resident along the Susquehanna river, for instance, that the sulphur water from the mines is advantageous to him, and the Board of Health is not depending on that sulphuric acid to purify the pollution, but is compelling the residents along the bank to dispose of their sewage in some other manner than by emptying it into the river.

It is small consolation to a man who has typhoid fever in his family from drinking water from the Susquehanna to know that if the stream had some distance further to run the water would have been purified. He is decidedly of the opinion that the pollution should have been prevented at the source, and both the sulphuric acid and the sewage and other pollution kept out of the stream.

A year or two ago a suit was brought in a western county against some oil producers who were allowing salt water from their wells to run into the water shed from which a water company obtained its water to supply a population of about fifty thousand people. While it was admitted that the wells were in oil producing territory and the oil pumped produced a revenue to the operators, yet for each barrel of oil there was pumped from twenty to fifty barrels of salt water. In an exhaustive opinion the court held that the rights of this large population to pure water were paramount to the rights of the owners of the wells and enjoined the well owners from pumping, if they could not dispose of the salt water in such a way that it would not defile the water supply of the water company. This decision was upheld by the Superior Court. From this analogy the Department hopes that it may not be long before the mine operators will be compelled to satisfactorily dispose of their mine water, and also the filthy water from the washeries and the culm.

In Germany a stroke of the pen of the Emperor decreed that the pollution of streams must cease, and forthwith every person defiling the stream went to work to see that the pollution no longer got into the water. Such paternal authority does not exist in this country, but public sentiment can grow so strong that the same results for purifying the water can be obtained by that public sentiment insistence on the purification of the water and the Courts will follow in the line of the sentiment.

This is a day of small economies and really what seem small economies sometimes prove to be money makers. The cotton seed for a long time was merely a waste product, but now, thanks to science, the cotton seed rivals in value the value of the lint.

In western Pennsylvania the air is black with the clouds of smoke from the coke works, but some chemist put his brains to work and the result is that at Bethlehem and at other places this smoke no longer escapes into the air but is converted into lamp black, a valuable by-product. The same result was obtained by the gas company at San Francisco, where instead of turning its waste products into the bay to the defilement of the water, it now saves them all at a profit to itself.

Much of this habit of defilement arose from the wastefulness of the average American who heretofore considered it only necessary to save the material that brought him a revenue and allow the rest to go to waste. The pine forests of Pennsylvania were swept away and the hemlock was cut down for its bark alone, until today hemlock lumber sells at a price double what the pine lumberman got for his lumber, and over the mountains of Pennsylvania lie piles of hemlock logs stripped of their bark and left to rot.

Upon the market today there are numerous devices gotten up by ingenuous persons intended for the saving of material that now runs to waste. While some of them have merit, the Department cannot recommend them because of the fact of their being patented, yet there is no reason why the manufacturers should not avail themselves of these appliances for many of the inventors offer to install their appliances for experimentation at no cost, if they do not prove efficient. Only within a short time an inventor stated to the Department that he was offered a contract for 75,000 tons of some of the effluent from the paper mills. It would seem from this that there is a commercial value for the material that is now running to waste and polluting the streams, and certainly an experiment would be worth the trial. If the coke man can extract money from his smoke, certainly other manufacturers ought to extract money from their waste material, because nature knows no waste but economizes in everything.

A closer co-operation between the dwellers along the stream and the Department would be of much aid to the Department in bringing about the clearing up of the streams. If when the surface of a stream becomes covered with dead fish some persons early cognizant of the fact would trace up the stream to where the first dead fish were seen and from that point take samples of water, cork them up and seal them and furnish them to the Department for experimentation, in most cases it would enable the Department to get in touch with the violator of the law and he could be brought to terms and compelled to abate the trouble or suffer the penalty.

During the year the Department has had some correspondence with the Fish Commission of West Virginia to see if some arrangement could not be made whereby the Commissions of West Virginia, Ohio and the Department of Fisheries of Pennsylvania and the United States Government could not co-operate so as to bring about a clarification of the foul streams in that section of the country. There are many streams out there that are absolutely devoid of fish life or aquatic life of any kind, and the water cannot be used for any purpose, the steam-boat men finding that it soon utterly ruins their boilers.

Such a state of affairs should not exist in a country that calls itself civilized, and the fact that millions of dollars have been expended to erect the manufacturing plants along these streams has nothing to do with the question, because they should have considered the matter before they erected their plants where they did. This condition is fully sustained by a decision of the highest Appellate Court of New York, which is published in full in this report, and this is supplemented by a similar decision of an Indiana court. If an investment of a million dollars allows the investor to so pollute the water that it renders worthless the property of a poor man below, then it would seem that the law is for the rich man and not for the poor, a condition not to be thought of for a moment in this great Commonwealth.

There is no question that electricity is bound, in the future, to be a great factor in purifying water. That it will do it is well known, but the cost has been prohibitive. Human ingenuity is, however, working at this problem, and it seems is on a fair way of solving it, so that the work may be done at a price that will be profitable. Sedimentation beds are useful adjuncts, but sedimentation beds must be so large that the water does not escape from them until it has dropped from its hold all the refuse that causes the pollution of streams. The trouble has been in the past that the sedimentation beds have not been of sufficient capacity, and they have been made in such an unsubstantial way that rains and floods have washed out the banks and sent the vile effluent down into the streams where it has done its deadly work to the fish, and there can be no apologies from such work when it entails several years to replace the damage done.

The Department has felt that no better work can be done than by getting in close touch with the people and telling them the aim and purposes of the Department. It has therefore availed itself of every opportunity to have the officers meet face to face with all classes of persons. Addresses have been delivered in all parts of the State to arouse public interest, and the Department feels very much gratified at the sentiment which has been created. The manufacturers are the ones who have been polluting the streams, and the Department has endeavored in every way to impress upon them that in these days of small economies and the prevention of waste, it is to their interest to co-operate with the Department in bringing about the purification of the streams, without considering the welfare of the users of the water below their establishments, which welfare they should consider, under the moral law, and not require force to make them observe it.

The paper manufacturers are among the worst offenders in turning refuse into the streams and the Department was glad to avail itself of an opportunity to meet with the Association of Paper Makers of

the United States at a meeting recently held in New York. The Commissioner himself was present and had an opportunity to express the views of the Department in the following address:

When a Commissioner of Fisheries stands before an audience like this he feels in the company exemplified by the poet:

"Two minds with but a single thought,
Two hearts that beat as one,"

because the entire success of both parties lies in the one thing and that is pure water. Without pure water the Commissioner of Fisheries is a helpless in the raising of fish as the paper maker is in producing white paper. Some has said, "Let me write the songs of my country and I care not who makes the laws," but in these days the advocates of law would largely urge in favor of paper on which to print the laws rather than the method pursued in the old days of Assyria and other ancient kingdoms, when the laws were printed on clay and baked into bricks. What grand weapons those bricks would make these days over in England where the Suffragettes are defying all the laws and would like nothing better than to cast the law covered brick bats through the windows of unoffending trades people.

The first paper makers in this country used rags, and even the mummies of ancient Egypt were robbed to help keep up the supply, but the supply of rags is no longer equal to the demand, in spite of the cry of so many persons that the poor are growing poorer and there are more of them, which would seem ought to increase the supply of rags.

Then the paper men turned to other sources and took lessons from the first paper maker who used wood pulp. A gentleman who used his paper to build a home, and while he did not pollute the streams with any refuse, the hornet carried a sting in his tail, which many a small boy found out when he thoughtlessly fired stones at the paper maker's abode. It is the tail race of the pulp and paper manufacturer today that carries the sting that annoys the Commissioner of Fisheries who desires pure water.

No one appreciates more than the Commissioner of Fisheries the value of the paper industry and the importance of its not being crippled, but nevertheless, as I said at first, pure water is as necessary to him for his business, as it is for the pulp and paper maker. When the paper maker first located on the stream he was probably the only manufacturer upon it, and the pure water was as cheap to him as the air which he breathed. When, however, some other manufacturer located above him and began to run refuse in the stream which spoiled its pureness and brought trouble and expense to the manufacturer, there was another exemplification of the case of whose ox was gored. To purify the water defiled by the man above, the paper maker was compelled to put in purification plants, and this is a factor with which the fishery interest hopes to impress you. If the manufacturer above can be compelled to purify his water then the money expended by the paper man for getting that formerly dirty water purified can be expended in seeing that his refuse no longer pollutes the stream. A regard for the rights of one's neighbors should be inherent in every human mind, because every one should do unto his neighbor as his neighbor should do unto him.

But back of all this is the question of economy. In the workings of Nature there is no waste. When a giant of the forest falls before the storm, it lies on the ground and gradually wastes away. Not an atom of it is lost in the economy of nature and the remnants of that tree go to make up the food for a successor. Eons ago when the world was younger by some millions of years the world bore a luxuriant crop of vegetation—trees and plants. In one of those mysterious cataclysms of nature, this vegetation was shrouded in what is known as the carboniferous age, and these trees and this vegetation became what we today called coal. This coal has become one of the most important factors of life, but with its use men are learning that every part of that coal has a value, and all that is not saved is so much of a waste and a loss of capital.

Among the most important uses to which coal is put is in the form of gas and coke and the manufacturers of these products use coal by the millions of tons. The coal represents in another form the tree that lived in the carboniferous age, which tree is almost identical with the tree that is used by the paper maker today. The gas and coke maker were the first to recognize the fact that in the workings of nature there is no loss, everything being utilized.

The first ovens used to make coke from this coal sent all the gas to foul the air, while the waste products ran to defile the streams. In this latter they came in contact with the fishery interests, and loud were the demands that the pollution should be stopped. But self interest is greater even than regard for the public welfare, and the makers of coke began to take steps to save every particle of product. At the Bethlehem Steel Works they have erected a series of coke ovens from which not a particle of anything escapes, but every part of the coal is made a source of revenue. The gas that was allowed to escape from the primitive ovens is now used in helping heat the furnaces while the tar and other products are found to be of a value that surprises the makers.

The same was true with the first makers of gas. They saved at first merely the gas and allowed to run to waste the substances which were the foulest kind of pollution for the waters. So foul was this pollution that the public revolted and the gas makers were compelled to take measures to dispose otherwise of their refuse than by running it in to the streams. At San Francisco the gas companies have put in a plant which takes care of its refuse, and to the astonishment of the makers, they have discovered a source of revenue in lamp black and other products, that add to their revenue in a way that makes the makers wonder they had never gathered that money before.

Such being the experience and work of the men who handle coal it should be a lesson that one who runs may easily read, and it seems that the pulp and paper maker ought to ponder well over this lesson as he looks upon the tree which is to go into his crucible. Why should he not evolve some means to use every particle of that tree, for every particle of it has value.

Even the fiber that escapes and pollutes the stream could be utilized into making wood alcohol. Somebody has defined dirt as being matter out of place, and pollution is merely only another name for matter that ought to be turned into something of value by being put into its right place. Such being the case there is no reason that the

paper and pulp maker today should not so far consult his own interests and a benefit to the Commissioner of Fisheries by following the teachings of nature, and the lessons taught by the coke and gas man, and instead of polluting the streams with waste from his mill, turn that waste into pecuniary profit.

No State in the Union has lovelier streams and lakes than the Keystone State of Pennsylvania. The streams meander through the valleys and should be kept so pure that they would not only be a Paradise for fish, but a source of water supply for the inhabitants who people the banks and the stock that graze upon the fields. The lakes of Pennsylvania lie like jewels nestling among the hills and their pollution would be a crime. Speaking of the water supply, this is one of the greatest questions that the people of modern times have to meet. New York City alone is spending hundreds of millions of dollars to secure an adequate supply of pure water for the use of its inhabitants and to clear up the pollution of the harbor.

The child learns to read by beginning with the letter A of the alphabet, and the clarification of the water supply should have its first step in stopping all pollution at its source. You, gentlemen, have been among the most flagrant violators in the past, and yet it is to be hoped that from your well known public spirit, backed by the economies to which I have alluded above, you will be among the first to take the most stringent steps to bring about the stoppage of pollution and co-operate in every way with the fishery authorities in securing purer water in which the fish can thrive and multiply. You need, as I said above, as pure water to secure perfection of your manufactured product as the Commissioner of Fisheries needs for the growth of his special wards, and this being the case, it is hoped that from this time forward the co-operation between us both will be, as I said in the beginning:

"Two minds with but a single thought,
Two hearts that beat as one."

Good examples are contagious, and if the pulp and paper makers follow the example of the makers of coke and gas, it will make such a profound impression upon other manufacturers that the day of pollution will be banished to the caves of the past and the era of pure water and good feeling will be fully established.

THE SUPREME COURT SAYS POLLUTION MUST STOP.

As mentioned before in the report, the Courts are all getting in touch with that public sentiment which requires that streams shall be no longer used as public sewers, but the waters must run as pure as they did in the days before the white man settled in Pennsylvania.

Recently the Health Department brought suit against the Devon Sewage Company asking an injunction to restrain the company from allowing the escape of sewage into Darby creek. The Court of Chester county decided that this condition does not constitute a public nuisance; that inasmuch as Darby creek is a private stream in a sense that the riparian owners along it own *ad filum aquae*, the public can have no rights therein, and consequently the pollution of such streams constitutes nothing more than private injury, of which only a riparian owner may complain. The Supreme Court says:

As the State by recent legislation in the exercise of its public power in the interests of the public, has resumed in one important particular, and for a definite purpose, its control of all the flowing waters of the Commonwealth, and in consequence the riparian owners gives all this exercise of power by the State, can no longer be said to be alone interested. While the legislation does not make all streams public streams, it does subject them to police patrol, because while not public streams, they are susceptibly turned into public nuisances. Because the public health is endangered by drainage of sewage into any flowing stream, the Legislature has denounced it as an offense on the part of any one permitting it.

The Supreme Court in view of the facts that so much damage could be done by the sewage running into the stream, ordered the court below to enter a decree enjoining the defendant from maintaining and operating their sewage plant in a place where it is now maintained and operated, in such a manner as permits sewage to escape from said plant and drain and flow into Darby creek or its tributaries.

The Act of May 1, 1909, which governs the Department of Fisheries in respect to pollution, forbids the running of any refuse into a stream which deleterious to fish or fish life. It carries the same police powers as were conferred on the Department of Health in regard to keeping water pure, and the Department of Fisheries therefore feels that the ruling in regard to the Devon Sewage Company will be made by the Supreme Court, if it is necessary, to carry one of the pollution cases to the upper court.

PRESQUE ISLE PENINSULA.

On Presque Isle Peninsula in Lake Erie there are a number of ponds which were formerly the favorite spawning grounds of a number of fish. Pennsylvania turned over the control of the Presque Isle Peninsula to the United States for light house and other purposes. Nothing was done in any way on the greater part of the peninsula and it grew up a tangled wilderness abounded with mosquitoes. The ponds and the inlets thereto gradually filled up with sand to such an extent that they were no longer occupied by the fish.

In 1909, by an Act of Congress, the greater part of Presque Isle was turned over by the United States to the Department of Fisheries, and April 22, 1909, the Legislature passed an act authorizing the Department of Fisheries to take possession of the land on Presque Isle in the county of Erie, lying between the east line of the Erie Water Works land and a line substantially parallel with and adjacent to the west side of the present walk extending from Misery Bay to Presque Isle light house, for the purpose of establishing thereon a fish hatchery for the propagation of fish.

The Legislature in 1911 appropriated \$20,000 for the purposes mentioned in the act, but after due consideration by the Department it was decided that the proposition, as embodied in the act, was too broad and nothing was done under that appropriation.

The Legislature in 1913 appropriated \$20,000 specifically for dredging out the ponds and the channels leading thereto. The Department has had plans drawn up for the improvement contemplated under this appropriation. The ponds will be dredged out to a depth of two to four feet and the channels opened to connect them with the Bay. These channels will afford a good flow of water and keep the water in the ponds from stagnating.

The water in Lake Erie rises and falls sometimes several times in a day and this creates currents through the channels to the ponds, the channels being of such a character that they will afford a good flow of water. The capabilities of these ponds are great, as they will restore the natural spawning places of many fish, and the Peninsula is really the only place left of the original natural spawning grounds.

THE QUESTION OF DAMS.

That the water in the streams of Pennsylvania will be allowed to go to waste instead of being used as a maker of power is no longer doubtful. They will be dammed and harnessed to plants which will create electric energy that will furnish light, heat and power now created by the burning of fuel, the expense of which is growing heavier every day. Conservation of new energies is now the great question before

the people and the elimination of such waters as the untrammelled flow of the rivers to the sea will no longer be permitted. The erection of the dams will create large bodies of water throughout the State, and each of these bodies of water can become great sources of supplies of fish, because the increase in the water space means more space for fish to live and thrive.

The only real migratory fish in Pennsylvania are the shad and the eel, and Erie has become the greatest fish market in the world, and has done so without any shad or eels being part of their catch. There are really few streams in Pennsylvania which shad would ascend, even if there were no dams in those streams, while it requires a very small inducement for an eel to make his headway to the upper waters of a stream. Besides this, there is always an equal divide in regard to the eels, one-half of the people being their champions, while the other half regard them as the most undesirable life in the streams.

During the past year the Department has stocked the huge dam of the Pennsylvania Water & Power Company, at Holtwood, on the Susquehanna, and it proposes to continue this stocking until the dam or lake abounds with fish, ready to give every angler a full string, if he does not have to enter into competition with the violator of the law who uses a gill net and every other destructive means of fishing.

In by far the larger number of the streams of the State the dams are a benefit rather than a detriment to the fish, as the dams make more extensive bodies of water and greater depths, so that there is room for far more fish than there would be in the streams if there were no dams. It is true that it is possible that some of the bass, pike-perch, or other fishes, may get over the dam and be unable to get back, but they will be so few that they are not worth considering. None of the fishes in Pennsylvania, except the shad and eel, are migratory, though it is true they will ascend the stream some distance to spawn so that the Department would rather recommend the damming of the streams as a means for procuring more areas of water in which to raise fish.

FISH FOR THE FARMER.

To supplement the fish work of the Department of Fisheries the Department is extremely desirous of securing the co-operation of the farmers of the Commonwealth, because if the farmers will take up the culture of fish they will be able to add largely to the food supply of the people.

The capabilities of an acre of land in raising fish is but little understood, yet from an acre of water may be taken annually from 5,000 to 6,000 pounds of fish. The fish after the first installation require little care, but some supervision over their enemies and the enemies that attack the banks, such as muskrats and crawfish. The fish will be self supporting and therefore is the only live stock on

the farm that does not require a layout for feed. There is hardly a farm of any size but has an acre or more of waste land. Several farmers might unite and prepare a pond of larger size than an acre and therefore capable of raising more fish.

The first cost of the pond would be the excavation and banks, but that pond would clear out the waste ground ugly to look at and baneful from the weeds that it constantly raises. Therefore, instead of an eyesore there would be a joy and a delight, for a glimpse of water adds to the beauty of the scenery and fishing in the pond would be a continual source of recreation.

For such ponds the Department recommends bluegills and catfish. The blue gill multiplies rapidly and attains a weight from half a pound to over a pound. Few fish appear upon the table of the epicure that excel in delicacy the bluegill, while his gamey qualities are such that even the expert angler does not disdain practising flyfishing for the bluegill. The catfish is too well known to need any encomium from the Department. He attends strictly to business, raises his family with the care shown by few other fish and upon the table when properly prepared he appears to the best advantage.

The Department stands ready at any time to furnish the farmers with any information they would desire as to the construction of the pond and the care of the fish. Two hundred adult fish will be ample to begin the stocking of the pond and it will not be long until the pond is a source of profit, a change of diet and a delight to the whole household by affording the sport of fishing.

A few tadpoles introduced into the pond will result in a supply of bull-frogs, not large, of course but enough to furnish an occasional meal for the farmer's family, and bull-frog as an article of diet is not to be despised by even the most fastidious epicure.

The fish pond will also afford the children of the farmer a chance to study fish lore and the habits of the fish which will so interest them that as they grow up they will be advocates of the fish laws passed to protect fish from wholesale and destructive slaughter. The bluegill builds a nest with much care and after the eggs are deposited watches over that nest unceasingly, fiercely attacking any enemy that approaches it. The slightest foreign substance he proceeds to remove with a care that would reflect credit upon a tidy housewife. It is this habit that makes him a victim to the angler who does not regard the breaking up of a family as a crime. The fisherman throws his baited hook to the watchful guardian of the nest whereupon the guardian makes a rush to remove the offending substance, and in the rush is impaled upon the hook and taken to the string of the angler, which means that the whole family of little fishes are doomed to destruction. If the boy or girl knows this he will become a protector of the fish and try and see that no fisherman despoils the nest of the parent.

THE STORY OF FISH LIFE.

There is nothing more important in the eye of the Department than the enlisting of the rising generation as the friends of the fish. If the boys and girls of the Commonwealth can be shown how the fish lives, its habits, its instincts, and all the various phases of its life, the child will become interested and incited by that interest will be impelled to follow its study as he grows older and the more thoroughly he acquires an interest in the mysteries, for they are mysteries, of the lives of the dwellers in the water, the more he will become convinced that the requirements of the laws which have been enacted to throw around the fish to safeguard them are necessary for its protection in these days of constant growth in population.

With this idea in mind the Department has built a number of metal cabinets of ornate design in which it has placed a number of vials which contain some phase of the growth of the fish from the time that it is in the embryo in the egg until it has started in the race for life. The specimens are taken, in one case, from the trout as the representative of the game fishes of the Commonwealth and in the other instance from the white fish as a representative of the commercial fish.

Describing the cabinet a bulletin has been issued which tells of the characteristics of the fish, wherein they differ, and tells of the growth from the embryo to maturity. These cabinets are intended to be placed in those educational institutions of the Commonwealth which devote at least some time to the study of natural history.

To the person who knows nothing of the life and habits of the fish, the fish represents only so much of a portion of man's food. But to one who studies the life of the fish and its habits there is opened a volume as interesting as any upon the book shelves of the library and he finds treasures for thought like the man who found "sermons in stones and books in running brooks."

SPRUCE CREEK HATCHERY SOLD.

January 29, 1906, the Department purchased from Sidney T. Isett a plot of ground containing 27 acres and 20 perches in Spruce Creek township, Huntingdon county, for the sum of \$1,000.00. Spruce creek runs through the grounds the whole length. This property contained no buildings of any kind. It was a broad meadow lying very little higher than the water of the creek.

March 27, 1907, the Department purchased from Daniel Heck another parcel of land containing 980-1000 of an acre on which were two dwelling houses and a stable. The price paid was \$2,150.00. On the tract purchased first was a large limestone spring with a

capacity of from 600 to 1,200 gallons a minute. A large frame hatching house was erected and a number of ponds were dug. After the work of propagating trout was begun an unexpected trouble was experienced from the water from the spring. There was high water and the spring rose and evidently entered a crevice and washed out a greasy looking substance which the United States authorities pronounced an algae that grows in the dark. This algae was very destructive to the young fish.

In the Superintendent's report for 1907 he says that the rise of the spring in June of that year brought with it the algae which kept flowing from the spring for nearly two months. It got into the gills of the advanced fry and killed all but 80,000.

Spruce Creek, for some distance above the hatchery, runs through a narrow gorge, bounded by high hills, so that when there are heavy rains the creek rises rapidly and the water flows over its banks at the hatchery and floods the grounds. The first experience was in March, 1907, when the melting snows and a heavy rainstorm caused a rise in Spruce creek and the upper part of the grounds was flooded and the water came within a foot of flowing into the ponds. The troughs in the hatching house flooded and there was about two feet of water in the house. It was then decided to build a dyke along the creek.

In the report of the Superintendent for 1908 he states that on account of two floods in March and May he lost several thousand trout. He also reports that in that year the experiments with bass showed that the station was not suitable for the propagation of bass.

The Superintendent in his report for 1910 says early in February there came a sudden thaw and a heavy downfall, which created a flood in Spruce creek. It was the heaviest flood in a number of years. It overflowed the banks of the stream and rose within six inches to the top of the dyke. A breach of 10 feet wide was cut from the dyke and the flood poured into the large pond carrying away the entire stock of bass, sunfish and catfish. The flood also carried away the bridge across Spruce creek near the dwelling house.

In September, 1911, Spruce Creek was again flooded and the water about destroyed nearly all the improvements on the hatchery grounds. The large hatching house was undermined and had to be taken down, while many ponds were destroyed. Of the ponds left a number of others were washed out by a subsequent flood. The work of restoring the hatchery would have been virtually more expensive than building a new one, and the Board of Fishery Commission, in view of the situation, decided that the best thing to be done with the property was to sell it.

Spruce creek, as mentioned above, would always be a constant menace, and a dyke sufficient to protect the property would be enormously expensive and there would always be a liability of a break from some cause.

A bill was introduced into the Legislature of 1913 authorizing the sale of the property and it was enacted and signed by the Governor. The property was advertised for sale and was knocked down at \$3,050.00, within \$100.00 of the original price. This was a remarkably good bargain for the Commonwealth.

AN AMATEUR'S EXPERIENCE.

Some very interesting letters come to the Pennsylvania Department of Fisheries, especially those relating to the experiences of persons in raising fish. Recently one was received from Indiana county that shows how successful persons can be in raising fish and frogs. The correspondent says:

"I tried propagating brook trout years ago, built a small pond and stocked it with wild trout I caught. They lived and grew nicely for me, but after studying the matter I concluded I could not give them the care and attention necessary, so about that time the German carp was introduced and we got a few from the State and they did nicely.

"I made a larger pond, about an acre in extent, ranging from one foot to seven feet in depth with a spring in one corner of the pure cold water that will not freeze in winter. I soon had barrels of fish, some of them two and a half feet in length. I supplied every one that wanted any to stock ponds, and people came from eight to ten miles for fish for sick people, which we also supplied. Everybody said they were good and we used some and thought them very good when not too large.

"But finally chubs got into the pond and got so numerous that they ate all the spawn of the other fish. There were millions of them from one to two inches long, and I sent for some wall-eyed pike which the State supplied me. I got two cans and the fish looked like grounds in the bottoms of the cans before we put them in the pond. I think it was in March when we planted them and in the late Fall I caught some of them and they measured from eight to ten inches in length, while the little chubs were all gone. The last pike I caught measured 22 inches in length.

"Then I caught some rock bass and put them in the pond along with a few catfish. I think they are hard on other fish and the pond seemed to be full of little ones from two to four inches long. I am catching them out and putting them in the streams around here. I can hardly catch anything but the little ones for they take the hook as fast as it is thrown into the water. I now want them all out and want to stock my pond with the best varieties of catfish.

"I have raised the big river frog by the thousands. They are no trouble at all to be raised. All that is needed is a good pond with plenty of water deep enough for protection and the borders well covered with water plants such as bull-rushes, flags, swamp grass, etc. so they can hide and spawn in it. As soon as the spawning season is over the big fellows take to the fields and off to the streams traveling quite some distance, as farmers tell me they find them in their springs and watering troughs two or three miles from here. When spawning time comes, however, we find most of them back and almost making the earth shake with their music. I thought at first I could not stand it, but now I like to hear them after our long dreary winters are over.

"They have innumerable enemies, crows, hawks and snakes that destroy many of the little ones, while minks, muskrats and raccoons

live on them to some extent. The frogs live largely on insects, but they will catch small birds and a small chicken two or three weeks old will be swallowed with the rapidity that will surprise the on-looker."

NEW BOAT AT TORRESDALE.

The last Legislature made an appropriation of \$1,500.00 for the purchase of a boat to be used at the Torresdale Fish Hatchery. Such a boat was greatly needed, especially during the shad season, when it visits on the river the various fishermen and gets the shad eggs from them. Out of the appropriation the Department has purchased a boat 34 feet long and 8 foot 6 inches beam and fully equipped in every way for the work, there being plenty of room. The boat is a cruiser so that it will stand any weather that it is likely to meet in the Delaware river. The value of the shad fishery has been increasing every year and the new boat will be a great help in assisting the work of gathering the eggs.

THE COMMODORE PERRY.

The Department's tug Commodore Perry on Lake Erie has continued to prove her value to the service. All the fish hatched at the Erie station and the Union City station were duly and carefully planted by the Perry, and all the eggs obtained from the Canadian shore were brought by the Perry to the hatchery.

It is a terrible storm which will deter the Perry from going to her work or performing an act of duty. When storms rage high on the lake and imperiled boats call for help, it is the Perry that is always called upon to go to the rescue and she has never failed in an emergency. Time and work had left their finger marks upon the sturdy vessel, and the last Legislature made an appropriation for the rebuilding of the boat and put her in such staunch condition that she would not be a menace to the lives of her gallant crew when they sailed from the harbor, either for work or to the rescue of imperiled lives.

The last session of the Legislature passed an appropriation for raising the Niagara, the flag ship of Commodore Perry, in the battle of Lake Erie, from her watery grave in Misery Bay, where she had laid submerged for seventy or more years, and the Commodore Perry was a very valuable aid in doing the work.

FISHWAYS.

The lack of efficiency of part of the Cail fishway at Holtwood Dam caused much popular discussion among the fishermen at that point. Meetings were held in York county and resolutions adopted demand-



New Fishway in the Susquehanna River at Holtwood.

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THE COMMODORE PERRY.

The Department's tug Commodore Perry on Lake Erie has continued to prove her value to the service. All the fish hatched at the Erie station and the Union City station were duly and carefully planted by the Perry, and all the eggs obtained from the Canadian shore were brought by the Perry to the hatchery.

It is a terrible storm which will deter the Perry from going to her work or performing an act of duty. When storms rage high on the lake and imperiled boats call for help, it is the Perry that is always called upon to go to the rescue and she has never failed in an emergency. Time and work had left their finger marks upon the sturdy vessel, and the last Legislature made an appropriation for the rebuilding of the tug and put her in such staunch condition that she would not be a menace to the lives of her gallant crew when they sailed from the harbor, either for work or to the rescue of imperiled lives.

The last session of the Legislature passed an appropriation for raising the Niagara, the flag ship of Commodore Perry, in the battle of Lake Erie, from her watery grave in Misery Bay, where she had laid submerged for seventy or more years, and the Commodore Perry was a very valuable aid in doing the work.

FISHWAYS.

The lack of efficiency of part of the Cail fishway at Holtwood Dam caused much popular discussion among the fishermen at that point. Meetings were held in York county and resolutions adopted demand-



New Fishway in the Susquehanna River at Holtwood.

ing that a better plan of fishway be put in the dam. Even the Legislature took the matter up and passed a resolution ordering a fishway put in the dam which would meet the requirements of the fishermen.

A careful study of the bottom of the river and the flow of the current was made, and a plan adopted of placing on the York county side a fishway which would resemble as nearly as possible the flow of a natural stream. The Dam Company co-operated most heartily in every way with the Department to carry out the plans, and the result is a waterway like a natural riffle. It is nearly a thousand feet long and over sixty feet wide. It is built in the most solid manner of concrete and rock, and it certainly looks as if any fishway will be used by fish, this ought to be the one. It will be impossible to tell, however, what the result will be until after the migration of the shad next spring. There is no doubt, however, that it will afford a passage-way for eels, for eels are much like the old fashioned Mississippi steamboat that would run on the ground after a heavy dew.

Successful fishways have been the study of the fish culturists for years, and all have been pronounced failures, except in the case of the fishways for salmon, which fish is a bold jumper and will ascend places which the shad will not attempt. A covered fishway will not be taken by the shad who fears its shadows, and the fishway at Holtwood is an open way.

Since this fishway is built it has attracted wide attention and the Department has received letters from many of the Departments of Fisheries of the various States and the United States asking for the details of the construction. As showing the general interest in the matter, the Department has received a letter from a representative of the Imperial Fisheries Institute of Japan asking for the plans and descriptions of the newly built fishway so that it may be studied as an available fishway for the waters of Japan.

FAIRMOUNT PARK AQUARIUM.

The Department of Fisheries has continued its co-operation with the Philadelphia Park Aquarium in the way of keeping up its supply of fish, and feels that in doing so it has helped to furnish much information and pleasure to the visitors at the Aquarium in Fairmount Park. The following is the report of the Superintendent of the fish caught by the employees of the Aquarium during the year 1913:

Fairmount Park Aquarium,
Philadelphia, December 1, 1913.

Yellow perch,	189
Large mouth bass,	66
Sunfish,	468
White perch,	1
Rock bass,	1

Also last spring the Water Bureau drew off the water from the old reservoir at Fairmount, preparatory to its demolition to make room for the new Art Gallery. I took therefrom the following fish (approximately):

Yellow perch,	16,000
Sunfish,	3,617
Small mouth bass,	9

The sunfish and yellow perch being far in excess of the number required for aquarium purposes, were transplanted to the Wissahickon creek, about:

Yellow perch,	10,000
Sunfish,	3,000

and the remainder were placed in lakes in Fairmount Park.

Confirming my report of last year, for 1912, I would say, that no small mouth bass were taken this year from the Schuylkill river at Fairmount Dam. But a large number of large mouth bass were caught. The small mouth seems to have disappeared entirely. That only nine small mouth bass were found in the reservoir, it seems to me, clearly indicates that this species has entirely disappeared from the lower river, due undoubtedly to the bottom being covered with mud instead of rocks.

W. E. MEEHAN,
Superintendent.

PERMITS.

Under the provisions of the Act of May 1, 1909, the Department is authorized to issue permits in various cases such as to transplant fish, take fish for scientific purposes, &c. The following permits were issued during the year:

To transplant fish to suitable waters,	10
To take fish or specimens of aquatic life for scientific purposes,	5
To screen an artificial pond in which the water was being lowered for repairs,	1
To use explosives,	9
To close the fishway on account of low water,	5
To remove carp,	2
To take fish for spawning purposes,	1
To take eggs in Lake Erie,	1

The permits for the use of explosives were issued generally for the purpose of allowing persons to remove rocks that interfered with navigation, but four permits for the use of explosives were for the purpose of raising corpses of persons accidentally drowned.

TIDE WATER SEINE LICENSES.

One license was issued during the year in Philadelphia for the use of a haul seine for taking carp, suckers, mullets and catfish under the provisions of the Act of June 3, 1911, in the tide water streams wholly within the Commonwealth and within the limits of tide water of said streams. Since the closing of the year the treasurer of Delaware county sends in three duplicates of licenses that he issued during the year. So these license fees do not appear in the receipts for the year. Under the law remittance of the license fees should be made at once to the Department of Fisheries so that the license can be registered on the Department books as notice to the wardens that the operators of the nets are duly licensed.

GERMAN CARP.

Some years ago Dr. Spencer Baird thought it was desirable to introduce the German carp into American waters, not considering the fact that there are so many fish native to this country that are far superior in every way to the German carp. The German carp was introduced into Europe by the Crusaders and instantly made itself at home, in which process it about eliminated all the other fish, leaving the carp as the main fish to be depended upon for a fish diet.

It multiplies enormously and grows to a large size, but the average person regards it as coarse and growls over their abundance in Pennsylvania waters. It has come to stay and therefore the best will have to be made of it. The youthful German carp affords a fine diet for the black bass and other fish, and therefore should have some value in the eyes of bass fishermen. There are few persons aware of its value as a food fish, but statistics show that carp to the value of nearly \$300,000 is sold in Pennsylvania annually. It sometimes sells in the Philadelphia market at as much as twenty cents a pound, the fish being taken to market alive, and this high price is paid by the Orthodox Jew whose religion requires his food to be koshered.

It is due to the carp to say that he first got his bad name as food from the fact that he was planted in warm ponds with muddy bottoms and as the carp revels in mud his flesh was not only coarse but muddy to the taste. When taken from clearer water the taste of the carp is very much improved and he has appeared as a fish upon such bills of fare as the Waldorf-Astoria in New York City.

The carp is a vegetable feeder and prefers the roots of aquatic plants to the plants themselves. This love of roots drives him to stirring up the bottoms of the streams and waters and keep them constantly muddy. This muddy water floating over the spawning beds of the bass, for instance, drives the bass from his nest, and the result is the death of the bass eggs. In addition the carp is a spawn eater like the sucker and he develops almost human ingenuity in his pursuit of his favorite food.

Fishermen tell what seems like extravagant stories of the ingenious way in which a carp will lure a bass from his nest in order that the various friends of the carp may get at the spawn. The bass will guard his nest and fiercely attack any enemy that approaches the nest, but the fishermen say that one carp will attract the attention of the bass and engage him in a running conflict while the eggs are being eaten by the other carp. That there is a demand for the carp for market is shown by the various requests from the fishermen living around Philadelphia to take out licenses to net for carp, and in Presque Isle Bay where the carp had become a nuisance the Department issues licenses at \$5.00 a piece for the taking of the carp and the take runs into thousands of pounds.

So long as the carp has a commercial value there will be fishermen who will take it, and complaint comes from the Delaware river that the carp are fished for so persistently that the fish are becoming scarce and laws are asked for to make a close season.

RAINBOW TROUT.

As mentioned in a former report, the Department learned that the rainbow trout thrives and multiplies when in the coldest waters, close to the snow line. Millions have been planted in Pennsylvania and rarely one has been caught. The Department, therefore, no longer propagates the rainbow trout, because of lack of waters in which it will live, and where the applicant asks for rainbow trout, if the waters show a temperature above 60 degrees, the brown trout is sent him.

The Department is not in favor of introducing haphazard any fish not inhabitants of the State, believing that the fish native to the Commonwealth are fish to restock the streams, because it is following the course of nature and nature knows best.

It was an experiment to introduce the German carp into streams, and while the German carp is a food fish and commands sometimes very high prices in the market, he is not nearly as desirable a fish as any of the species of fish native to the Commonwealth. Fish are naturally cannibals, but nature in its work, provided a balance so that there were not more enemies than there were fish that those enemies preyed upon. The sucker, for instance, is a spawn eater, and so is the eel, and when the carp was added to the fish in the waters of the State it destroyed the balance by bringing in the spawn-eater.

BROOK TROUT.

With the work of rebuilding the ponds and hatcheries there was much interference with the propagation of fish, yet the Department made a better showing than it had really hoped for. The plan adopted by the Department to plant only trout in the yearling stage necessitated more pond room than was required when the fish were shipped in the fingerling stage, but every Superintendent bent his energy to the work and really did surprisingly well, considering the drawbacks they had to contend with.

This question of pond room the Department hopes to have settled by next year, and then the output of trout will be brought up to the demand. That the shipments have been successful is shown by the fact each recipient is requested to return a statement as to the number of fish he actually received and the condition they were received in, and not one person in fifty made a complaint, but spoke in the highest terms of the satisfactory manner in which the fish were received and showing by the tone that they had appreciated the larger size of the fish sent which were so evident to the naked eye. Under this system of getting returns sent it is possible to fix the trouble and to bring about a remedy, or if it is caused by the carelessness of the messenger to dismiss him from the service so that the same cause could not be operated again through him.

There are many streams in Pennsylvania which would be better trout streams if little care and judgment were used by the farmer and the angler. The streams need shade to keep the water cool and this shade can be secured by planting shrubs and bushes along the bank. These shrubs afford a nesting place for various kinds of winged insects whose larvae will drop into the stream affording food for the fish, thus serving a two-fold object of shading the stream and furnishing food for the denizens. The stream should be supplemented with branches of trees to bring it to its former natural condition, the branches being hiding places for the fish, especially for the young fish, and thus a protection from their many enemies. In many sections of the Commonwealth the timber is again growing up and this converts former trout streams into present ones, they having been deserted by the trout when the water ran warm due to the rays of the sun that are now shaded by the growing timber.

The Department has received several requests that streams be closed for a period, in order, as the petition asked, that the fish may have a chance to grow and multiply. The Department is not in sympathy with this closing of any streams, but believes that they should be kept open and kept full of fish by constant restocking. While closing a lake or pond has advantages, these advantages do not pertain to a stream. In addition to this the worst fishing of a stream is done by the fish pirate who uses all sorts of illegal methods to get the fish. To advertise the closing of a stream is to notify the pirate that the fish have been placed in it and he sneaks to the banks by night to do his nefarious work and captures the fish that some at least should belong to the law abiding citizen.

MUSCALLONGE.

The Department has supplemented its first planting of muscallonge in Pennsylvania in 1912 by a second planting during this year, the eggs being obtained by exchange with the New York Conservation Commission. The fish were planted in the various lakes in the western part of the State where muscallonge were natural inhabitants, and very encouraging reports come from those sections as to the thriving of these planted fish. The taking of a lunge is considered the highest possible sport by anglers, and the Department hopes by repeated plantings, to keep up the supply in those lakes where it was a natural inhabitant.

It is an extremely voracious fish and therefore most undesirable to plant in any but its native waters, as it would really clean up a body of water even more effectively than the bass, because it is a larger fish than the bass, and has an appetite in proportion to its size. Under no circumstances will the Department introduce the muscallonge into waters east of the Allegheny mountains.

BROWN TROUT.

With the passing of the forests and brush many former good trout streams have become too warm for the speckled brook trout. He is a decided connoisseur of waters and quickly flees from any water that rises above sixty degrees of temperature, while he prefers water of much lower temperature than this.

Some years ago a German introduced into this country the trout of England, whose praises were so profusely sung by Izaak Walton, the Patron Saint of all anglers. Unfortunately the fish got linked to them the name of the German brown trout, which as they are the English trout, is a misnomer, like the term salmon applied commonly to the pike-perch. The brown trout thrives and flourishes in the formerly too warm trout streams, and he grows to a size that fills the fisherman's soul with joy. While not so gamey as the brook trout, yet taken altogether he is rather a sportsman's fish, as sometimes he will give a battle royal to the angler using light tackle.

In the view of the Department the brown trout is a desirable fish and it is proposed to propagate them in such quantities that the streams to which they are suitable will be stocked in a manner that will afford the fishermen good creels.

The brown trout is confounded by many with the rainbow trout, but as has been shown in a previous report, the rainbow trout is not suitable for the waters of Pennsylvania as he thrives only in the coldest waters that flow from the summits of the Rocky Mountains, while the brown trout are increasing and multiplying in many of the streams of this great Commonwealth.

The question has been asked the Department whether the brown trout will not drive out the native charr or brook trout. Experience shows that the speckled brook trout is fully able to take care of himself in the waters which are suitable for him, and therefore there is no fear that the brown trout will ultimately drive out the native speckled trout.

The reports received by the Department from the streams stocked with brown trout are extremely favorable and show good catches from streams that some years ago were inhabited by speckled trout, but which the speckled trout had abandoned by the water becoming too warm, and the streams were fishless until the brown trout were introduced. In Brodhead's creek in Monroe county the brown trout have done extremely well and do not seem to have affected the number of brook trout in the colder waters of the stream. It has been noted that at the opening of the season when the water is still wintry cold the catch is nearly all speckled trout, but as the season advances and the water is warmer the brown trout are caught.

THE BLACK BASS.

The black bass is one of the game fish that is in great demand by anglers, and more applications for this fish are probably received than for any other except trout, yet as a matter of fact the Department does not recommend the planting of black bass in any but the larger streams of the State, such as the Susquehanna, Juniata and Allegheny rivers.

It is a most destructive fish and kills for the pleasure of killing. After a bass has surfeited itself it will proceed to attack a school of fish after the manner of a terrier killing rats in a pit, and will destroy numbers of fish merely to satisfy its savage desire for fun. In many of the lakes in the northeastern part of the State where bass have been planted, the fishing has really been badly spoiled. There were numerous lakes where there was good fishing for pickerel, yellow perch and bull-heads, but since the introduction of bass have become poor resorts for the fishermen.

The bass is an erratic creature. Some days it will be possible to go to a lake and make a good catch, and then one may go for a week and not get a strike. On this point the Department is trying to make an object lesson to the anglers as to the capabilities of a lake to afford fish for the angler. It has secured the Beaver Meadow Reservoir in Wayne county as a necessary adjunct for the supply of water for the Wayne hatchery. The reservoir contains about 150 acres of water, which has been planted during the past two years with fish until it absolutely teems with fish, all fishing for the present being prohibited. In the course of another year or so it is expected to open this lake to fishermen who use one rod and line, and the Department feels sure that with only rod and line fishing the supply of fish in the lake will be equal to the demand.

It is noticeable that the bass thrive better in the streams in the Ohio Basin and are more prolific than in the waters in the north-eastern part of the State. This is probably due to the higher temperature of the waters in the Ohio Basin. Dr. James A. Henshall thus speaks of the black bass:

"The black bass is eminently an American fish. He has the faculty of asserting himself and making himself at home wherever placed. He is plucky, gamey, brave and unyielding to the last when hooked. He has the arrow rush of the trout, the untiring strength and bold leap of the salmon, while he has a system of fighting tactics peculiarly his own. He will rise to the artificial fly as readily as the salmon or the brook trout, under the same conditions, and will take the live minnow or other live bait, under any and all circumstances, favorable to the taking of any other fish. I consider him inch for inch and point for point the gamiest fish that swims."

It is this gamey character that commends the bass to the angler and the bass always lives up to his reputation, but as shown above, there are limitations to the desirability of placing bass in all the waters of the Commonwealth. Give him plenty of room and when he is in a mood for biting the angler can take him, but when he is planted in a small lake, and it is not his day for biting, the angler gets nothing, because the bass has virtually exterminated the other varieties, and if he had not been planted in that small lake the fishermen would go home with a string of pickerel, yellow perch and bull-heads, which is a far more satisfactory condition than going home with nothing to show for his day's sport.

The black bass is the hardest to propagate of any of the fish distributed by the Department. The reason is that the eggs cannot be taken from the fish artificially, and therefore the supply of bass must be entirely depended upon by cribbing the nest after the fish has naturally spawned. To allow the young bass to grow to a size suitable for shipping, there must be very large areas of water, to which end the Department has striven energetically.

In view of the fact that they cannot have the eggs taken from them artificially and the large areas of water required, the bass are the most expensive of all the fish to raise. Owing to lack of large areas of water the Department has not been able to accomplish much in the propagation of black bass, but it hopes soon to have secured such large ponds that it will be able to supply all the black bass that are needed for the State.

PICKERAL.

From the reports the past season has been a very good one for pickerel, many unusually good catches being reported. The prospects of a good season next year is very good owing to the fact that the mild weather has prevented tip-up fishing through the ice. The tip-up fishing is more destructive than the average person thinks, because examination shows that most of the fish taken through the

ice are females heavy with spawn, and each female pickeral caught destroys a very large family addition to the fish. The female pickeral during the ice season is getting ready to spawn and has an insatiable appetite which impels her to take everything edible in sight, as in the case with females of all kinds during the time of parturition.

There has been much confusion and considerable correspondence in regard to the open season from the fact that in the digest of 1911 the compiler made a table in which it fixed the open season for pickeral from June 15 to December 21, instead of December 31, as the law reads. This same mistake was repeated in the digest for 1913.

In view of this killing off of the female pickeral during the ice season, it would seem that the persons interested in pickeral would desire that the season for pickeral closed at the same time as it does for black bass and other game fish, that is November 30, which would cut out the ice fishing.

YELLOW PERCH.

The yellow perch is one of the most valuable of food fishes in the State and it is doubly valuable on account of its immense fecundity. There are lakes in northeastern Pennsylvania where the yellow perch are so abundant that the expert angler regards them as a nuisance, but the fishermen who wants a fish dinner finds that the yellow perch are just what he wants. It is gamey, it takes the hook with avidity, and where they abound it does not take long to obtain a string, and to its edible qualities it is regarded by many as the best pan fish of all the fresh water fishes in the State.

During the past two years the Department has been planting very many yellow perch and the result has been that in cases like Presque Isle Bay at Erie, it is becoming well stocked with the fish, and every fisherman is enabled to get a good string. The eggs of the perch are largely gathered by field work, the perch depositing its eggs in a string upon branches and roots in the water. The Department hopes to continue this work with the yellow perch until it has fully restocked all the streams and waters for which it is suitable.

DELAYED REPORT.

It is a source of much regret that the annual report for 1912 was not received from the printer until long after the adjournment of the session of the last Legislature. The Department had carefully worked out its plans and showed what it intended to do during this year. If this report for 1912 had been received by the members of

the Legislature it would have made the work of the Department more thoroughly understood and brought about a better feeling towards the needs of the Department.

In closing my report I wish to extend to you my most grateful thanks for the many courtesies received at your hands and your very valuable advice in the administration of the office.

Respectfully,

N. R. BULLER,
Commissioner of Fisheries.

REPORT OF HATCHERIES.

CORRY HATCHERY.

Corry, December 1, 1913.

Hon. N. R. Buller,

Commissioner of Fisheries.

Sir: Herewith I have the honor to transmit the annual report of the Corry hatchery for the year ending November 30, 1913.

The year just passed has been a very busy one, especially since the first of June when the new appropriations became available. Very complete plans for the completion and rehabilitation of the hatchery had been carefully drawn and contracts awarded for the work to be done, so that it could be done as soon as the money was in hand.

The first contract was to build the ponds under Unit No. 1, which comprises 23 ponds. They were built of re-enforced concrete with concrete bottoms, the walls being from 10 to 14 inches thick, and from 21 inches to three feet deep, amply sufficient to stand any frost thrust, the concrete bottoms making the cleaning of the ponds much easier, and cleanliness is one of the first demands made of the successful trout culturist, as unsuccessful hatchery people have discovered by sad experience.

The ponds run from 20 to 40 feet long and 16 feet wide. There are eight more ponds which are all completed, except the coping, frosts setting in before they were completed. The 23 ponds are all in use and prove very superior to the old make-shift ponds. Two reservoirs 10 by 10 feet and four feet deep were also completed. There was also a number of flumes built in the same substantial way with re-enforced concrete.

All the ponds are arranged so that they can be fed or drained separately, and the water is fed to the ponds with a good aeration so that it can be used over and over again to its final capacity. A number of retaining walls were also built in the same manner as the other work. The finished ponds are all topped with a neat coping which adds materially to the appearance of the work. Indeed, all the ponds are really as much an ornamental adjunct as useful.

During the coming year it is expected to finish up the remaining ponds in the same substantial and ornate manner as those constructed this year. This will make the Corry hatchery one of the most complete and substantial hatcheries in the country in regard to ponds and facilities, and afford ample room to raise all the trout that will be demanded by the section of the country that it is called upon to supply.

A new and substantial hatching house was also built of brick and steel with floors of concrete, there being no wood used in the construction except the window frames. It is 110 feet long by 38 feet wide, two stories high, the upper story furnishing storage room for the cans and other requisites. It will contain 17 double troughs 18 feet long and 18 inches wide on the inside. The hatchery will also be fitted with a heating apparatus, which will add materially to the comfort of the employes, as the greater part of the work of the raising of trout has to be done when the eggs are in the troughs and the thermometer ranges outside much below the freezing point, and anybody who has tried it knows that working in water only a few degrees above the freezing point with the temperature of the air much below the freezing point, is not as pleasant a pastime as eating ice cream on a hot day in the summer.

The water supply at this hatchery is entirely under the control of the Department of Fisheries and is ample for any demand that may be made upon it. These are the two most essential points on the working of a hatchery: The absolute control of the water and plenty of it, a shortage of water being death to the fish and always occurring at the wrong time, if it occurs at all.

The grounds have all been graded as far down as the No. 1 hatchery, a very large amount of the earth being required to fill in, some places being five feet. All the marshy spots which were eye-sores were filled up. The trees were thinned out so that the grounds will not be so much shaded and the whole sown with grass which set finely and promises a nice lawn by the coming year.

A number of deciduous trees were set out and much shrubbery of an ornamental character. Most of the trees taken out were of the evergreen variety whose shade was too dense for grass to thrive under and whose needles smothered the grass they covered. The walks were all regraveled and the grounds terraced, steps being placed in the walks where required.

A new roof was placed on No. 3 hatching house. A gravel road was put in from the road to this house. Shades were made and placed over all the new ponds, the shades being made of inch surfaced with stringers of four by six inch surfaced pine and all painted. The spring house was all gone over and painted. The grounds east of the new hatching house were all cleared of brush and will be treated as an ornamental park, though a few ponds will be added there.

Next year other desirable things will be added, among these will be a half dozen large ponds for the carrying of the larger fish, especially the breeders of the brown trout, as the demand is such for these fish that it will be necessary to propagate them in larger numbers than ever before. The Department is not able to obtain the eggs of the brown trout so it will have to arrange to have a supply for its own breeders. A meat house is needed at some distant point of the grounds, as in spite of every effort in the way of cleanli-

ness there is a smell from the meat house that is undesirable in the air that visitors and employes are obliged to breathe. A larger ice house is also needed as the way that the fish are now shipped requires more ice than formerly.

During the year the propagation of fish was much interfered with by the work going on in the ponds. This required the changing around of the fish from pond to pond and there was too much handling while the water was kept roily. It was really surprising that the hatchery was able to show the results that it did. The end of the year showed that nearly every application had been filled and there are enough fish left to fill all the applications on hand.

There has hardly been a complaint filed by the persons who applied for fish, but on the contrary the recipients have sent in complimentary remarks. On two occasions where the fish did not arrive in satisfactory manner the trouble was found to have been the negligence of the messenger in one case and the other of failure to obey orders, which resulted in the discharge of the messenger so that he could not repeat the fault.

The notification to an applicant for fish that his fish will be sent on a certain date and a certain train seems to be worded so that it ought to be understood by every one who could read English, yet in spite of the fact that the letter says "unless the man answers no fish will be sent," there are some persons who do not take the trouble evidently to read the circular for they do not send in an answer as to whether they will meet the fish, and consequently they get no fish, because the shipment is not made, which causes them after some time to write to the Department in a sarcastic manner as to why their fish did not arrive.

The Department used to have more faith in the genuineness of the purposes of the people who applied for fish, but after experiencing the loss of many cans of fish on the platforms of railroad stations, because the applicants did not take the trouble to come after them, it has come to insist that if the people are in earnest about getting fish they will at least take the trouble to write on receipt of a notice of shipment that they will be on hand to take care of the fish.

In spite of all the drawbacks under which the hatchery labored in raising its fish, the shipments were all gotten out in good condition and the strength and health of the fish was shown by the almost total absence of dead ones in the cans. This is a remarkably good showing when it is considered that the fish were shipped in all kinds of temperatures.

The first of the brook trout eggs were received November 3d, and all arrived in good shape with the exception of one case. At the time of this report the eggs are all doing nicely and promise a good yield.

The brown trout did not do so well as expected, there being only 20 trays of eggs taken as against 34 last year, though there were more breeding fish this year than last. The trouble was probably due to the constant changing and moving the fish had to undergo during the year. It is hoped that a far better showing can be made next year when the fish will not be so much disturbed. The following is the distribution of fish during the year:

YEARLING BROOK TROUT.

Allegheny County,	1,200
Bucks County,	5,400
Bradford County,	300
Centre County,	6,300
Cambria County,	5,400
Clarion County,	900
Clearfield County,	2,700
Clinton County,	15,600
Crawford County,	6,000
Columbia County,	600
Cameron County,	30,000
Dauphin County,	300
Elk County,	23,400
Erie County,	16,800
Fayette County,	24,000
Forest County,	10,800
Indiana County,	1,200
Jefferson County,	15,900
Lycoming County,	28,500
Lancaster County,	1,200
Luzerne County,	1,500
McKean County,	79,500
Monroe County,	3,900
Mercer County,	500
Northampton County,	3,600
Northumberland County,	5,400
Potter County,	28,200
Pike County,	10,200
Snyder County,	2,100
Somerset County,	6,600
Sullivan County,	18,300
Susquehanna County,	300
Tioga County,	3,900
Venango County,	13,600
Warren County,	16,500
Washington County,	1,500
Wayne County,	300
Westmoreland County,	300
York County,	2,700
Total,	395,600

YEARLING BROWN TROUT.

Allegheny County,	900
Bradford County,	300
Clinton County,	300
Centre County,	6,600
Crawford County,	3,000
Delaware County,	1,800
Elk County,	300

Erie County,	300
Fayette County,	300
Forest County,	2,100
Huntingdon County,	3,900
Luzerne County,	32,400
Lawrence County,	2,000
Lackawanna County,	14,900
Lycoming County,	3,300
McKean County,	600
Monroe County,	11,100
Montgomery County,	1,200
Northampton County,	6,900
Potter County,	300
Somerset County,	600
Tioga County,	300
Venango County,	600
Washington County,	1,500
Westmoreland County,	600
Wayne County,	1,500
Wyoming County,	1,200
Warren County,	1,800
York County,	900
Total,	101,500

For an exchange with the Dominion of Canada at Toronto, .. 5,000

ADULT BROOK TROUT.

Erie County,	100
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ADULT BROWN TROUT.

Lancaster County,	1,250
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BROWN TROUT EYED EGGS.

For an exchange with New Jersey Fish Commission,	15,000
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Total, 518,450

Respectfully submitted,

WILLIAM BULLER,

Superintendent.

ERIE HATCHERY.

Erie, December 1, 1913.

Hon. N. R. Buller,

Commissioner of Fisheries.

Sir: I herewith submit the annual report of the Erie hatchery from December 1, 1912, to November 30, 1913:

Owing to the fact that the Erie water supply is being treated under the direction of the Department of Health, the water is no longer fitted for the use in the hatchery here, so there has been no hatching of eggs at this hatchery during the past year, yet it has been a very successful season just the same, the fish eggs being obtained as usual and sent to Union City and other hatcheries for hatching.

While there has been a decrease in one variety of eggs there has been an increase in another, so that the total amount of eggs taken is very gratifying. All the fry from the eggs sent from Erie to other hatcheries to be hatched were returned and planted in Lake Erie. The fry for commercial fishing such as white fish and herring were the first to be received and started to come in carload shipments from March 20 to 29.

This was during the heavy rains and floods of last spring, when every train on the railroads was hours late which caused much extra work, and for five days and nights, with little or no rest, we were continuously hauling fry from the station to the harbor and thence taken by the Commodore Perry and planted out in the lake.

There were no blue pike planted the past year as it was impossible to get any eggs owing to the very poor fishing during the blue pike season.

Wall-eyed pike, yellow perch and muscullonge fry were shipped here from the Union City hatchery during May and all planted in Presque Isle Bay. The result of these plantings becomes more noticeable every year. Of the three fish mentioned, the increase in yellow perch in Presque Isle Bay is by far in the lead. Next comes the muscullonge, and while they have only been planted for the past two years the results already show that many of the fry live and thrive, a large number of muscullonge having been caught this past fall measuring from 25 to 28 inches in length and weighing from two and a half to four pounds, which are without doubt fish from the planting in the spring of 1912.

The result of continued planting of wall-eyed pike in Presque Isle Bay is not entirely satisfactory. While there are some caught they are not nearly enough to show satisfactory results from the large number of fry annually planted. For years the wall-eyed pike planted were hatched from eggs that were received from the United States Bureau of Fisheries and were taken at Toledo, Ohio. For the past few years for various reasons no wall-eyed pike eggs were received from the United States field in Ohio, but the Commissioner of Fisheries has been able to secure an annual supply from the New York Commission, the eggs being taken from fish caught in the Oneida Lake, which fish are commonly called landlocked.

Since the introduction of the wall-eyed pike from the New York field, the increase of these fish in Presque Isle Bay is much more apparent than ever before. As high as a half dozen four and five inch fish have been taken in one haul with a minnow seine, while the hatchery force were seining for minnows and other small specimens along the shores. This has only occurred in the past two years, and if we continue to plant these so-called landlocked pike with the continuous good results we will be able to determine whether there is a difference in the habits of the native fish of Lake Erie and those of Oneida Lake in New York.

There was an increase in the amount of revenue collected from the commercial fishing tugs, nets and other devices used during the past year, the amount collected being \$2,275.00. This is conclusive proof that appliances and devices are annually on the increase, due to the increase in the production of fish for commercial use, and this is the best evidence that the course of the present Commissioner of Fisheries in insisting that nothing be left undone in the gathering of all eggs possible from commercial fish is keeping pace with the annual drain made by the constant fishing.

Acting under instructions from the Commissioner of Fisheries special licenses for fishing for carp in Presque Isle Bay were again issued this year for the months of May, June and July. There were 26 licenses taken out at a fee of five dollars. The returns of the holders of these licenses show that there were 101,756 pounds of carp taken the wholesale value being \$1,526.34, or an average of a cent and a half a pound. Under the rules and regulations as laid down by the Commissioner, there was no harm done to any other class of fish.

It is to be regretted that as yet there has been no dredging done in the west canal basin so as to allow the tug of the Department of Fisheries free access in and out. At times when the lake level was below normal and no other moorings or dockage were available, it was necessary to chance it and get to the Department's dock with the Commodore Perry. Fortunately, the boat escaped breaking its propellor, but it is not good for the boat to be coming constantly in contact with the rocky bottom of the basin while going to or from her dock. It is earnestly hoped that the work of dredging will be started early next spring.

In accordance with instructions the Commodore Perry was turned over to contractors McDonald and Baker, who received the contract for rebuilding and remodeling the same. This was a much needed piece of work as the tug has seen hard service since it was first turned over to the Department of Fisheries. The rebuilding will render the boat more seaworthy, while at the same time it will give more of the much needed deck room to handle the yearly increasing number of cans of fish being planted in the lake.

Satisfactory headway is being made in the building of the new hatchery on the lake. When it is completed the building will be a credit to the Department, and one that the citizens of Erie can point to as being worthy of the Commonwealth. When completed it will mean the saving of much money that is now spent for dray hire in carting the eggs to the hatchery, and the fish and fry to the lake from the hatchery, as the boat can come right up to the doors of the new hatchery and load.

In accordance with instructions I took charge of the fish exhibition at the Exposition Park for the Conneaut Lake Fair Association. It was the best display of fish that was ever made at the Exposition and was a constant source of pleasure to the visitors, who crowded around it. The Board of Directors of the Exhibition sent a letter of thanks and compliment for the fine exhibit.

It may be safe to say that fully 80 per cent. of all work done at the Erie hatchery is directly due to field work. All eggs for commercial fishing are gathered from various fields on Lake Erie, as are many varieties of adult and fingerling fish for breeding purposes.

March 22, began seining for adult blue gills, but owing to the high stage of the water, continued cold and rainy weather, the work was far from a success. After persistent efforts it was given up, the catch being only 150 fish all told. May 1st trap nets were set for adult small mouth bass to be used as brood fish. Up to June 16 278 fine fish were caught and all shipped to the Union City hatchery, from September 3d to October 4th, 331 adult bass were turned over from the Kolbe Fish Company from their pound nets, which were also sent to Union City. Adult blue pike were also gathered from the pound nets and shipped to Union City hatchery for distribution. August 1st to October 4th a seine was drawn for fingerling perch, 14,300 being caught and shipped to Union City for distribution.

There were 220,621,000 white fish and herring eggs gathered from the various fields this season. The number of eggs of each variety and where shipped will be found in the table of output hereto attached.

Unfortunately, the white fish fields from Port Dover, Ontario, to Port Maitland, Ontario, were not as productive of eggs this year as in past years, due to the fact that the Canadian Government put spawners into its field, the Canadian Government having decided to take all the eggs from the field until such time as they would get their hatcheries filled. The spawn came on the first day of November, but owing to the very light run of white fish, it was the 22d of November before the Canadians had taken enough eggs and turned the field over to Pennsylvania. It was in the afternoon of the 22d that word was received from the Commissioner that the field had been turned over to Pennsylvania. By the evening of the 23d the Commodore Perry had arrived at Port Dover and our spawning outfit was distributed at the various fisheries for 20 miles along the shore. The fish were at their best spawning period, but unfortunately the run of fish was very light. Eight days were spent on the field but only 3,888,000 eggs were secured, but they were very good eggs.

The eggs received from the Ohio field from the United States Bureau of Fisheries were of very poor quality. It seems to me that the best policy would be while co-operating with the United States authorities at Put-In-Bay, to stop taking green eggs and wait until eyed eggs can be gotten.

While the herring fishing out of Erie was very light this fall, the catches running from 150 to 2,500 pounds, with the lighter hauls in the majority of cases, yet it was a most successful season for the taking of herring eggs from November 22 to December 8, by covering 40 tugs with spawntakers, the large number of 117,821,000 herring eggs was secured. There was very favorable weather during the spawning season of the herring, and the captains and crews of the

fishing boats rendered every possible assistance to the spawntakers and it was mainly due to their hearty co-operation that the Department was able to get so many eggs from such light hauls of fish. Few if any spawn fish were overlooked. The able assistance the fishermen rendered was certainly much appreciated.

There were no blue pike eggs taken in May. The blue pike fishing was so light that when the spawning season was on, all the boats had pulled out their twine and laid up. Had the fishing been good, however, it would not have been possible to take any eggs owing to the fact that the funds for field work were exhausted at that time.

I wish to heartily thank the Commissioner of Fisheries, the Board of Fishery Commission and the various Superintendents of the Hatcheries for their hearty support and co-operation accorded during the past year. The following is the report of the output of the hatchery during the year.

EGGS RECEIVED AND WHERE SHIPPED.

HERRING EGGS TAKEN AT ERIE.

Union City Hatchery,	74,942,000
Torresdale Hatchery,	59,691,000
Bemis Point, N. Y. Hatchery,	39,188,000
Total,	173,821,000

WHITE FISH EGGS.

Union City Hatchery,	34,272,000
Torresdale Hatchery,	12,528,000
Total,	46,800,000

TOTAL OF ALL EGGS AND WHERE TAKEN.

Erie Herring,	173,821,000
Port Clinton, Ohio, White Fish,	42,912,000
Canada, White Fish,	3,888,000
Total,	220,621,000

FISH DISTRIBUTED.

Small Mouth Bass, Adults, Union City Hatchery,	609
Bluegills, Adults, Union City Hatchery,	150
Yellow Perch, Fingerlings, Union City Hatchery,	14,300
Yellow Perch, Yearlings, Union City Hatchery,	300
Total,	15,359

No return is made of blue pike shipped to Union City. The figures will be found in A. G. Buller's output from that hatchery.

Very respectfully submitted,

PHIL H. HARTMAN,

Superintendent.

TORRESDALE HATCHERY.

Holmesburg, Philadelphia,
December 1, 1913.

Hon. N. R. Buller,
Commissioner of Fisheries.

Sir: I again have the pleasure to submit to you my annual report of the Torresdale hatchery from December 1, 1912, to November 30, 1913.

After receiving the white fish and herring eggs from the Erie hatchery in the early part of December, 1912, it was found necessary to make repairs to the two pumps at the hatching house so they were both overhauled and placed in first class running order. Later in the month two tubes blew out in the boiler and the water in the hatching house had to be stopped for a number of hours, but by feathering the eggs constantly there was but very little loss caused by this accident.

The white fish eggs which came from the Canadian waters were eyed up with very little loss, but the white fish eggs received from the Ohio waters and taken by the United States Bureau of Fisheries were in very bad condition when received and not over 50 per cent. of them eyed up. The herring eggs which were taken at Erie were very poor and the loss in eying them up was very heavy. After the eggs were eyed at this hatchery they were shipped to A. G. Buller, Superintendent of the Union City hatchery in the latter part of January, 1913.

The first yellow perch eggs were gathered from the hatchery brood ponds March 23. After this date the weather held very cold with the result that the perch spawned very slowly, but after the water got warmer the perch started to spawn fast when there came a very heavy rain which lasted for several days. This muddied the water to such an extent that we were unable to find the eggs in the water. After the water cleared in the Bristol pond enough so that the eggs could be found most of the eggs were smothered by the dirty water.

The perch fry were all planted in the Delaware river and its tributaries, and from all accounts they have done very well as there have been a great many fingerling yellow perch caught at different places along the Delaware river by people seining for minnows. Some of the fishermen have reported that they saw more fingerling yellow perch last fall than they have seen in years.

The wall-eyed pike eggs from the Wayne hatchery were received April 16. They were the same as year before—very good eggs and hatched with very little loss, some of the eggs not being taken out of the hatching jar and screened from the time that the green eggs were placed in the jar until they were hatched.

The applications were all filled and a large plant was made in the upper Delaware river, while a plant of fry was placed in the lower Delaware river. There were a number of adult wall-eyed pike caught by the fishermen in the lower Delaware river last spring in the shad nets.

On account of the low temperature of the water there were no shad eggs gathered until April 28, and the water was very cold all through the shad season, but the eggs that were taken were very nice and about 70 per cent. of the eggs turned into the hatchery were hatched. Every effort was made to secure all the eggs possible on the Delaware river so far as we were able to cover the river from the hatchery. The fishermen all took great pains to save all the eggs that it was possible for them to do. Most of the fry was planted in the lower Delaware as on account of the cold water the fry had to be planted as soon as they were hatched or they would settle to the bottom of the fry tank and smother. It might be added that this planting of the fry in the lower Delaware river appeared to greatly please the fishermen.

The catch of shad in the Delaware river was reported to be very nearly double that of the year before, while the shad are running larger in size from year to year, a 10 pound shad being very common this year, and there were a few taken that weighed over 13 pounds. The shad fishermen all claim that this was due to the artificial propagation of shad that is being done by the Pennsylvania Department of Fisheries. All say that before there were any shad artificially propagated in the Delaware river that an eight pound shad was a very scarce fish and would be a prize to the man who caught it.

There was a shad taken from the Delaware river in which was found a fully developed roe and milt, the roe and milt being attached together but showing the division line very plainly. It was certainly a case of curious double sex and is preserved here at the hatchery.

The young shad could be seen early in the fall going down the river by the thousands in schools. Sometimes the schools were so large that it would take over an hour for a school to pass by. The shad were about two and a half inches in length and were making their first trip to the salt water.

In the latter part of May there were a number of shad fry placed in one of the fry ponds to be kept there until fall before planting in the river. When the pond was drawn off in the fall the fish were about three inches in length. It was found, however, that these little shad could not be taken out of the pond with a net, for as soon as the little fish would touch the net they would knock off some scales and when they were placed in a tub of water would float on their sides and die in a very short time.

As soon as the shad work was over the catfish field work was started. There were a good many eggs gathered from the meadows along the Delaware river, but we were about two weeks late in starting to gather the eggs. A great many of the eggs had been left dry by the tide leaving them and they were dried up in the sun, but there were also some of the eggs that were hatched. As this was only an experiment we were not so anxious to get the eggs as we were to catch the spawning fish. The eggs that were gathered were placed in the hatching jars with very little loss. As the catfish eggs are in a jelly mass it was found that only a few could be placed in a hatching jar as otherwise they would smother.

After the eggs were hatched the young catfish were held in the hatching jars until such time as they absorbed their food sacs. After that they were placed in a fry pond by themselves where they could be watched very closely. They began to feed when very young and

grew very fast and were as large this fall as the catfish that were hatched naturally in the brood ponds. I am of the opinion that the eggs can be gathered by field work and hatched with a much larger percentage than they can be hatched naturally in the brood pond. The adult catfish in the ponds did very well starting to spawn about the first of June. Part of the fry were removed to fry ponds and part of them were left in the brood ponds with the adult fish. The applications were all filled and large plants were made by the Department in the Delaware, Susquehanna and Schuylkill rivers.

The bluegill sunfish at this hatchery spawned through the month of June. The young fish were left in the brood ponds with the adult fish. On account of there being so much animal life in the water these fish grew very fast. They were all taken out of the ponds and shipped this fall, all applications being filled and a number of plants made by the Department in the different rivers. The adult sunfish at this hatchery are of the Lake Erie bluegill variety and two or three hundred more brood fish are needed very much. There have been a number of the Lake Erie bluegill sunfish taken from the Delaware river last summer by the hook and line fishermen showing the success of the plantings of these fish made by the Department.

The adult frogs are allowed to go free and spawn in any brood pond they choose. They travel from one pond to another in the night, the spawn is left in the ponds to hatch and after the tadpoles are a good size they are transferred to a small pond and left until fall when they are shipped out. They are all of the large bull-frog variety and the tadpoles will average about four inches in length when they are shipped.

Not many gold fish were raised this year on account of the small number of brood fish. There has been a big call for them from the schools of Philadelphia. There are at the hatchery at the present time about 80 very fine adult fish, which should produce a good lot of gold fish fry next spring.

There were a few calico bass gathered by field work on the Delaware river. They were placed in one of the brood ponds but most of them had spawned before they were caught.

There were also some brood catfish taken from the river and placed in the brood ponds before the spawning season. A good many brood fish are still needed at this hatchery to stock the ponds properly. The adult fish are all in a very thrifty condition and look very favorable for a large lot of eggs the coming spring.

The side walls of the dwelling house were resurfaced and painted with two coats of the best paint, making a decided change for the better in the appearance of the house. There was a water line installed from the Torresdale pumping station to the hatching house which has proven a great success. There is one three inch line with a pressure at all times, and one two inch line with a hundred pound pressure, which only runs eight hours a day. This supplies the hatching house with water enough to run the two batteries, except on Sundays and Holidays. At such times the pump has to be started once in 24 hours, long enough to fill the storage tanks.

Two concrete walks were made from the dwelling house to the driveway. There was a slip or boardwalk made which runs from in front of the hatching house to low water mark in the Delaware river, a distance of 360 feet, so that a boat can run there at any stage of the

tide. The slip is set on concrete blocks and is four feet wide with a handrail on one side and lighted with electric lights. The slip has to be taken in before the ice comes in the fall, but the concrete blocks are left from year to year. On account of the hatchery work that is done on the river this boat landing was a much needed improvement, while there are hundreds of people who travel the river in the boats and desire to visit the hatchery and without this slip they would not have a chance to land.

The new motor boat purchased was hauled out for the winter at the boat yard at Delanco, New Jersey. This boat has been very much needed for the hatchery work on the Delaware river. It will be put in condition early in the spring for the work of gathering the shad eggs. It will also be extremely useful in other field work. It is a 36 foot boat with a 12 horse power engine, and will enable us to cover a larger portion of the river than in previous years, besides which it is a boat that the State can take pride in.

There was an Ordinance passed by the Philadelphia Councils extending the lease of the hatchery grounds for 20 years.

The ice house was filled with five inch ice for the spring shipping and the summer months. The shipping cans were all painted and stenciled. There were a great many trees which had died, grubbed out by the roots. Some unsightly brush on the grounds was removed, all of which added greatly to the appearance of the grounds.

After the yellow perch started to spawn in the spring the time was all taken up until after the shad season in the gathering of eggs, hatching the same and shipping the fish. Besides the care of the fish through the summer months, the grass was kept cut on the hatchery grounds and numerous improvements made to the ponds and sluiceways, while some grading and other work was done on the grounds. In the fall months the ponds were drained off and the fish sorted. The bottoms of all the ponds were cleaned out, the banks repaired and the fingerling fish all shipped out.

The following is the output of fish from December 1, 1912 to November 30, 1913:

CATFISH, FINGERLINGS.

Allegheny County,	800
Beaver County,	200
Bedford County,	200
Berks County,	5,600
Blear County,	200
Bradford County,	400
Bucks County,	5,800
Butler County,	200
Centre County,	200
Chester County,	200
Clarion County,	200
Clinton County,	1,200
Columbia County,	800
Cumberland County,	400
Dauphin County,	600
Delaware County,	200
Erie County,	200

Fayette County,	200
Franklin County,	600
Huntingdon County,	3,200
Indiana County,	400
Lackawanna County,	1,200
Lancaster County,	11,400
Lawrence County,	200
Lebanon County,	1,000
Lehigh County,	1,000
Luzerne County,	2,400
Lycoming County,	1,600
McKean County,	600
Mercer County,	1,200
Monroe County,	1,400
Montgomery County,	5,200
Montour County,	400
Northampton County,	600
Perry County,	600
Philadelphia County,	13,200
Pike County,	200
Schuylkill County,	600
Sullivan County,	3,000
Susquehanna County,	200
Venango County,	200
Wayne County,	1,800
York County,	200
Total,	70,000

PIKE-PERCH FRY.

Berks County,	450,000
Blair County,	150,000
Bucks County,	450,000
Chester County,	150,000
Cumberland County,	150,000
Delaware County,	150,000
Juniata County,	300,000
Lancaster County,	450,000
Lehigh County,	150,000
Mifflin County,	150,000
Monroe County,	800,000
Montgomery County,	150,000
Philadelphia County,	790,000
Total,	4,290,000

SUNFISH FINGERLINGS.

Berks County,	10,000
Blair County,	200
Bucks County,	7,600
Cambria County,	200
Carbon County,	200

Chester County,	800
Dauphin County,	1,000
Delaware County,	4,000
Franklin County,	400
Huntingdon County,	3,200
Lackawanna County,	600
Lancaster County,	11,600
Lehigh County,	600
Monroe County,	200
Montgomery County,	8,000
Montour County,	200
Northampton County,	2,000
Philadelphia County,	23,300
Schuylkill County,	600
Sullivan County,	200
Washington County,	400
Wyoming County,	400
York County,	400
Total,	76,100

TADPOLES.

Berks County,	3,000
Columbia County,	1,000
Franklin County,	6,000
Lancaster County,	9,000
Lehigh County,	10,000
Luzerne County,	1,000
Montgomery County,	4,000
Montour County,	2,000
Total,	36,000

YELLOW PERCH FRY.

Bucks County,	6,000,000
Philadelphia County,	5,000,000
Total,	11,000,000

EELS, ADULT.

Crawford County,	50
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WHITE FISH, EYED EGGS.

Erie County,	11,375,000
Philadelphia County,	80,000
Total,	11,455,000

LAKE HERRING, EYED EGGS.

Erie County,	2,000,000
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CATFISH, ADULT.

Lancaster County,	100
Lehigh County,	200
Total,	300

CALICO BASS, FINGERLINGS.

Lancaster County,	200
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SHAD FRY.

Monroe County,	500,000
Philadelphia County,	23,310,000
Total,	23,810,000

GOLD FISH, FINGERLINGS.

Lackawanna County,	16
Philadelphia County,	112
Wayne County,	85
Total,	213

GOLD FISH, ADULTS.

Philadelphia County,	12
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SHAD EGGS.

Philadelphia County,	1,000,000
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RIVER MINNOWS.

Wayne County,	8,000
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WELLOW PERCH, ADULT.

Wayne County,	133
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SUMMARY.

Lake Herring eyed eggs,	2,000,000
White fish eyed eggs,	11,455,000
Pike perch fry,	4,290,000
Shad fry,	23,810,000
Shad eyed eggs,	1,000,000
Yellow perch fry,	11,000,000
Yellow perch adults,	133
Eels adults,	50
Catfish, fingerlings,	70,000
Sunfish, fingerlings,	76,100
Catfish, adults,	300

Calico bass, fingerlings,	200
Tadpoles, large,	36,000
River minnows,	8,000
Gold fish, fingerlings,	213
Gold fish, adults,	12

Total, 53,746,008

Thanking you for the assistance and courteous treatment you have given me.

Respectfully,

J. R. BERKHOUS.

Superintendent.

WAYNE HATCHERY.

Pleasant Mount, December 1, 1913.

Hon. N. R. Buller,

Commissioner of Fisheries.

Sir: During the past year the propagation of fish at this hatchery was almost entirely cut out due to the entire reconstruction of the hatchery, except in the case of pike-perch or Susquehanna salmon, the eggs of which were received by exchange from the New York Conservation Commission. The eggs in this case were the best ever received of those fish at the hatchery. The trout eggs usually hatched here were shipped to Corry and Bellefonte for hatching.

The usual amount of field work was also not done owing to the scarcity of men and teams, it being impossible to secure a sufficient number for the work on the hatchery and for field work. The proposition of reconstruction has been one requiring much labor and of the most arduous character.

The Department having secured control of the Beaver Meadow reservoir, one of the reservoirs built by the Delaware and Hudson Canal Company, has an assured water supply for the hatchery, the controlling dam being of the most permanent character. The reservoir covers over 150 acres and thus gives a large body of water which can be used for field work as it is stocked with large mouth bass, pickerel, yellow perch and catfish. It will also be used as an object lesson as to what can be done in the way of affording an always abundant supply of fish where the restocking is attended to and the fishing limited to rod and line. The Department feels sure that this experiment will carry conviction to the people of the State that it is possible to so restock the dams and streams of the State with fish that everybody can always secure a mess of fish, if the wasteful and destructive methods of fishing are prevented and only angling allowed. If the Department can accomplish this it will feel it has fully demonstrated its usefulness and the reason for its being.

During the year three large bass dams have been about completed covering an area of nine acres, which with the one completed before gives a water area of 12 acres. These ponds have been constructed because experience has shown that the black bass can only be propagated profitably in large areas of water, and with these large areas it is possible to hold the bass until they grow to a size of several inches before planting.

Sixty-five hundred cubic yards of ground has been excavated from the part of the hatchery where the new hatching house and trout ponds are to be built, and this earth has been used to fill up and grade the low parts of the hatchery grounds about the dwelling house, making a handsome lawn possible at the approach to the hatchery.

Two shipping ponds have been built with concrete and are complete. They are 60 by 12 feet with a depth of four feet. In the old hatching house the troughs were on the floor and were unhandy and uncomfortable for the workers. The spring had to be built up to furnish a supply to these troughs. The consequence was that much of the water of the spring was lost owing to its seepage due to the building up. The water from the spring will be carried by a pipe line to the new hatchery and the ponds, and by lowering the walls of the spring a much larger quantity of water will be obtained, while the troughs will be much more convenient to work at. In addition to this the Department will be enabled to utilize the water of another small spring which runs below the old hatching house. When all the contemplated improvements are completed there is no question that this hatchery will be able to accomplish wonderful results in the way of furnishing fish for supplying the needs of the Commonwealth. With its ample room and water supply it will also be possible to indulge in experiments that ought to bring about many desired results as there is undoubtedly a large field of investigation open to the fish culturist.

The dam breast which backs the water of the Beaver Flow dam is built, as said above, in the most permanent character and secures control absolutely of the water supply for the Lackawaxen river at all seasons of the year, as it can be stored for times of drought. A fishway has been built in this dam of the most substantial character, re-enforced concrete being used. The fishway is entirely within the dam breast, its lower entrance being right at the toe of the dam so that fish coming up to the dam seeking a place to get over the dam will have no trouble in finding it.

The Department believes this is the proper construction of a fishway as fish ascending a stream always get as far up as the base of the dam or the obstruction, and do not possess enough instinct to go back and find an opening to a fishway a number of feet below the bottom of the dam, as is the case in the Cail fishway which is recommended by the United States Government. The working of this fishway will be watched with much interest and if it is successful it will be recommended as the proper fishway to put in dams.

The following is the distribution of fish during the year:

ADULT YELLOW PERCH.

Bucks County,	2,000
Bradford County,	700
Berks County,	2,400

Cumberland County,	600
Dauphin County,	2,400
Luzerne County,	3,500
Lancaster County,	3,000
Lackawanna County,	3,500
Lebanon County,	1,800
Lehigh County,	2,300
Monroe County,	900
Pike County,	750
Sullivan County,	300
Wyoming County,	2,150
Total,	26,300

YEARLING BROOK TROUT.

Bucks County,	600
Lackawanna County,	600
Lehigh County,	600
Luzerne County,	3,550
Monroe County,	3,700
Northampton County,	3,000
Philadelphia County,	50
Susquehanna County,	2,100
Wayne County,	7,000
Total,	21,200

Adult Brook Trout, Fairview Hospital,	100
Adult Brook Trout, Fairmount Park, Phila.,	20
Adult Brown Trout, Fairmount Park, Phila.,	10
Adult Rainbow Trout, Fairmount Park, Phila.,	20
Harveys Lake, Lake Trout,	20,000
Long Pond Lake Trout,	5,000
Rock Lake, Lake Trout,	5,000

WALL-EYED PIKE.

Bradford County,	200,000
Lackawanna County,	200,000
Luzerne County,	800,000
Monroe County,	500,000
Pike County,	500,000
Sullivan County,	400,000
Susquehanna County,	500,000
Wayne County,	300,000
Wyoming County,	800,000
Total,	4,200,000

Sly Lake Wall-eyed pike,	2,000,000
Long Pond Wall-eyed pike,	1,400,000
Bigelow Lake Wall-eyed pike,	2,600,000
Total,	10,200,000

ADULT PICKERAL.

Wyoming County, 1,000

TADPOLES.

Berks County, 1,000
 Columbia County, 2,000
 Cumberland County, 1,000
 Franklin County, 1,000
 Huntingdon County, 1,000
 Lebanon County, 1,000
 Lehigh County, 8,000
 Lackawanna County, 2,000
 Montgomery County, 7,000
 Northumberland County, 4,000
 Northampton County, 2,000
 McCall's Ferry Dam, 125,000
 Total, 156,000

April 15, Shipped to A. G. Buller, Union City, 1 case yellow perch eggs.
 " 18, " " " " 2 cases " " "
 " 21, " " " " 1 case " " "
 " 24, " " " " 1 case " " "
 " 15, " " " " 2 cases wall-eyed pike eggs.
 " 16, " J. R. Berkous, Torresdale, 2 cases " " "
 Received from Constantia, New York, April 15, 4 cases " " "
 " " Bellefonte, Penna., April 1, 30,000 lake trout fry.

Respectfully submitted,

G. W. BULLER,

Acting Superintendent.

ERIE AUXILIARY.

Union City, December 1, 1913.

Hon. N. R. Buller,

Commissioner of Fisheries.

Sir: Herewith I hand you my annual report for the year beginning December 1, 1912, and ending November 30, 1913:

Early in the spring of this year this hatchery was visited with a storm which caused an unusual flood that washed out the breast of the supply pond which supplies the hatchery house and the rush of water from this pond carried out four other ponds, but fortunately the ponds had been depleted of fish and therefore there was no loss of fish. The hatching house with its battery was left without water and the jars contained millions of eggs just at the hatching stage.

By the most energetic efforts a temporary bank was put in the supply pond so that the water could be sent to the battery once more. It was thought best, however, not to try to hold the eggs until hatch-

ed, so they were promptly sent to Lake Erie for planting. However, by great good fortune, after the eggs were loaded in the baggage car, they were so nearly hatched that most if not all the fish had hatched out by the time the lake was reached.

The flood also washed out the retaining wall along the creek in several places and an abutment under one of the concrete bridges. This involved a lot of construction work that had not been counted upon and it took most of the summer to put the hatchery back into its former condition. A neighbor who has lived here for 30 years said that he never knew of so much water ever coming down the creek. It had rained for more than a week and this, with the melting snow, did the damage. It showed, however, that it is not well to depend on anything that is not of the most permanent character in preparing a plant for a fish hatchery, and a rock foundation is the only thing to be depended upon, because sand always proves a poor reliance, a fact which was known way back in early Biblical days.

A heavy concrete wall has been built across the entire breast of the supply pond and there is no possible chance for the water to force a passage as it did through the old dirt bank where the frozen part of the bank made the part that was kept from freezing by its being under water, which was always a place affording a chance for undermining.

All the banks of the three fry ponds have been widened and strengthened, but there is little danger of their giving way from floods because the water is now all so thoroughly controlled from the supply pond, which is built in a manner that it will not give way any more. The Department expects the manufacturers of the State so to control the flow of pollution from their plants that it will not get into the streams even barring accidents, and the Department certainly expects as much from its Superintendents in the way of preventing floods from doing damage to the ponds, thereby losing fish which cost money to raise, and if the fish get away there are none on hand to be shipped to the public.

The three ponds have been deepened to a depth in the shallowest part of three feet, and two smaller ponds have been turned into one with a depth of not less than three feet. When these ponds had a depth of five feet shallowing down to nothing, my observation was that there were never any fry in the shallow water, and my inference was that the black bass prefer to live in the deeper water. One pond has been deepened to nine feet.

All the gates to the ponds have been replaced with concrete and thus made permanent. The dwelling house has been repainted and a contract has been made to paint the hatching house and barn.

The treating of the water at Erie by the orders of the Department of Health resulted in compelling the disuse of the hatchery at Erie for hatching purposes until it gets to its new site on the shores of the lake. This hatchery had been built as an auxiliary to the Erie hatchery and for the past two years has well proved its usefulness. All the take of eggs in Lake Erie was sent to this hatchery, with the exception of some sent to Torresdale, the surplus after this hatchery was filled.

The white fish eggs last spring were exceptionally fine, the most of them coming from Canada where the fish are generally taken in pond nets, while this fall's eggs, which are in the jars now, are not

so good, being largely from the American side and mostly taken from gilled fish. The supply of white fish eggs this fall did not fill the batteries and an extra effort was made to get a full supply of herring eggs at Erie. The result that over 93,000,000 of lake herring eggs were sent to this hatchery.

The lake herring are really a more important factor to the Erie fishermen than the white fish as they are taken in more abundance by these fishermen than the white fish are. It is my opinion, in view of this, that more effort should be made in the future to take herring eggs. These herring eggs were all taken from gill netted fish, but the spawntakers are being drilled into the best manner of handling the eggs and the eggs now in the batteries look as if they will produce a yield of at least fifty per cent., which is an extraordinarily good result when all things are taken into consideration.

The pike perch eggs heretofore have been gotten from the United States Government Station at Put-In-Bay, the Pennsylvania Department paying its prorata of the cost of taking. For the past two years no eggs have been secured from the United States authorities, as they were not successful in getting a supply. This year this hatchery got 11,000,000 eggs of the pike-perch from the hatchery at Wayne county, which secured them from the New York authorities, and they were extremely fine, looking like hand picked eggs, while the yield was far in advance over any other eggs ever received.

Yellow perch eggs were received from Wayne county where the eggs are gathered by field work from the lakes in that section of the Commonwealth where some of the people regard the yellow perch as a nuisance. There was a hatch of over 19,000,000, the greater part of which were planted in Lake Erie in the fry stage, but a goodly number were grown to the yearling stage and shipped to applicants in various parts of the Commonwealth. Under the planting of so many yellow perch in Presque Isle Bay during the past two or three years, the supply in that Bay has very visibly increased and the anglers in the Bay are now always sure of a string of these fish.

For the second time the Department was able to get a supply of muscallonge eggs through the courtesy of the New York authorities. This year there were half a million eggs received and they were all hatched. They were all planted in Lake Erie, Canadohta Lake, Lake LeBoueff, Edinboro Lake, Conneaut Lake and Wattsburg Pond. The reports from these lakes show that the muscallonge are evidently thriving as very many small fish are seen. The muscallonge is such a dangerous fish with its enormous appetite, that the Commissioner will not plant them in any waters except where they were before.

Owing to the irregular spawning of the blue gills the pond contains young fish of all sizes and it was thought the part of wisdom not to draw down the pond last spring, because it would result in the killing of so many tiny ones. Next spring the pond will be drawn and from the looks of the pond there ought to be a very large supply of these desirable fish for distribution.

There were 28,000 tadpoles, mostly with developed legs distributed, and they certainly were some tadpole. They were shipped at a time when they could have a chance to become acquainted with their new surroundings and find hiding places where they could dodge the man hunting for bait for black bass. It is a curious anomaly that some people will take a good healthy tadpole, that is within a

short time of becoming a frog and ready for the table at a price of forty cents a pound, to catch a fish that sells at twelve cents a pound. There is now a pond in which eight tub-fuls of tadpoles were planted this fall to grow up and be ready for planting next season. These are all of the big Canada variety and make some frog when grown up.

It is a rather curious fact about these frogs that a few weeks after they have spawned they seem to go back to hibernate as they are rarely seen again until the next spawning season. As songsters they far excell the small varieties and one man who heard them for the first time in their musical efforts, innocently asked, "Where do you keep your cows? They seem to be down in the pounds."

While there was a good supply of black bass in the ponds there were only ten nests. Quite a number of the females seemed to discharge their eggs wild and they would not fertilize. From the ten nests I raised 18,000 fish. While this was not nearly so many as I had hoped for, I was extremely gratified at the way I succeeded in growing those fish to a length of from two to six inches before they were shipped, thus disproving the claim that they cannot be kept in a nursery until they grow to any size.

It was an interesting study learning how to induce these little fish to feed on some other diet besides each other. The first trial was made with maggots, and as the little fellows gathered under the maggot manufactory there was some held back for lack of room at the lunch counter, and to these finely ground fish was thrown, and whether they mistook this for some new form of maggot, they took a risk and swallowed the ground fish. It evidently appealed to a weak place in their organs of taste for they soon came to dodge the maggots and eat only the ground fish. Once they got it into their heads that one of the purposes of their existence was to eat something else rather than each other, they set out to fill the purposes in a most active way. They were fed eight to ten times a day, not much at a time, so there would none of the food be wasted, and they thrived and grew, as I have said, to the length of from two to six inches, which was exactly the purpose for which I was feeding them, and I assure you I was much delighted to have them such willing accomplices in the good work.

The same result was obtained with the wild full grown breeders. Their pond was well stocked with minnows as being their natural food, but they seemed to have discarded their taste for minnows. As in the case of the little ones they were enticed to try a diet of ground fish with the result that they decided it was good for bass and preferable to minnows, which was a diet any fish of active habits could get if he wanted it really bad, while ground fish was only obtainable in a fish pond where somebody obligingly came around with it at regular and convenient intervals.

The following is the distribution of fish:

Bluegills, Fingerlings,	300
Bluegills, Yearlings,	2,800
Large Mouth Bass, Yearlings,	6
Small Mouth Bass, Yearlings,	17,960
Yellow Perch, Fry,	19,000,000
Yellow Perch, Yearlings,	10,545
Yellow Perch, Adults,	1,100
Pike-perch, Fry,	11,135,000

Pike-perch, Adults,	590
Muscallonge, Fry,	500,000
White Fish, Fry,	56,938,500
White Fish, for Public School Exhibit,	300,000
White Fish, Eggs,	422,000
Lake Herring, Fry,	3,000,000
Tadpoles, Yearlings,	22,000
Common Sunfish, Yearlings,	2,000
Rock Bass, Yearlings,	150
Catfish, Yearlings,	500
Total,	101,353,451

Respectfully,
A. G. BULLER, *Superintendent.*

BELLEFONTE HATCHERY.

Bellefonte, December 1, 1913.

Hon. N. R. Buller,
Commissioner of Fisheries.

Sir:—Herewith is my annual report of the operations of this hatchery for the year from December 1, 1912, to November 30, 1913.

During the year there was a busy time as there was much work in rebuilding ponds and putting them into shape to do efficiently what they were intended for. Walls were built around eight new ponds and 11 other ponds were rewalled. All this was done with re-enforced concrete so that the work would be permanent and not require the constant watchfulness and care of a makeshift arrangement. Of course, while this construction was going on it interfered greatly with the propagation of fish, but perseverance and good work will accomplish results under the most trying circumstances.

In consequence the employees of this hatchery were sparing neither in labor or perseverance and the result shows what well applied elbow grease and gumption will do.

These newly fitted ponds are now in the best possible shape to raise fish successfully, and this is well shown in the way they performed their duty of providing trout for the applicants, which trout brought letters of commendation from the recipients of the fish as to their condition and size.

The work of shipping was done as rapidly as possible and there was hardly a case that the messengers did not get the fish to their destination in the best possible shape or losing scarcely any. The only real complainers are those who do not want their fish to arrive in the evening, but if any one will take the trouble to look at the time table of the railroads on which this hatchery is situated, they will see that the Superintendent here has done and is doing the

best he can. It is no more of a hardship for the receiver of the fish to stay up a little later than usual so as to plant the fish than it is for a messenger to stay on the platform of a railroad station all night and aerate cans of water until he thinks that he has a task as continual as that of the fabled person who was doomed by the gods to fill bottomless jars as a punishment.

The trouble had been here that the water supply for a number of ponds had been taken from the Logan Branch and this water is almost always so roily that it is impossible to see the fish most of the time. Besides this, the settling of the water compelled the constant cleaning of the ponds at the expense of time and labor. To obviate this trouble 1,500 feet of 10-inch pipe was laid from the Shugart spring to the ponds and an ample supply of clear water is now assured, with the result that the fish are now kept under close observation and the work of cleaning out the ponds very greatly reduced.

The Shugart spring was walled up with a concrete wall 50 feet long so that the surface water could be excluded, while the grounds around it were graded. A large amount of grading was done around the new ponds so that beauty was added to utilitarian. Several hundred trees were planted on the grounds that foliage and shade may add their charms, and the useful supplemented the ornamental in that the trees in question are choice varieties of fruit. The hatchery grounds have great capabilities in the way of beautifying and the plans for the improvement of the hatchery included the landscape feature as well as the extension of the necessary adjuncts for raising fish.

Last Fall the hatchery received a million trout eggs and they yielded well. As the fish are now kept until they are in the yearling stage, shipping was not begun until October 15 when the young trout were from three inches to six inches in length and in perfect condition of health. Shipping was kept up as continuously as possible with the force of men here. This year the hatchery received over two million and a half brook trout eggs, and as this report is written the eggs show up finely and will furnish ample supplies for the applicants during the coming year.

Owing to the demand for brown trout to restock those old trout streams which have become too warm for the native speckled trout, this hatchery will install brown trout breeders so as to help meet the demand.

The following is the distribution of fish made during the year:

BROOK TROUT.

Berks County,	8,100
Blair County,	22,100
Bradford County,	12,600
Bucks County,	6,600
Cambria County,	22,400
Carbon County,	900
Centre County,	81,750
Chester County,	4,800
Clearfield County,	28,700
Clinton County,	3,000
Columbia County,	13,500

Cumberland County,	5,700
Dauphin County,	3,800
Fayette County,	600
Franklin County,	4,800
Huntingdon County,	29,300
Lackawanna County,	9,100
Lancaster County,	12,300
Lebanon County,	3,600
Lehigh County,	5,700
Luzerne County,	17,550
Lycoming County,	18,300
Mifflin County,	7,200
Monroe County,	8,100
Montgomery County,	8,400
Northampton County,	12,700
Northumberland County,	9,600
Perry County,	1,500
Potter County,	14,100
Schuylkill County,	14,100
Snyder County,	4,800
Somerset County,	17,600
Sullivan County,	6,000
Susquehanna County,	600
Tioga County,	2,400
Union County,	6,600
Washington County,	300
Wayne County,	600
Wyoming County,	2,100
	<hr/>
	431,900

LAKE TROUT.

Wayne County,	60,000
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GOLD FISH.

Luzerne County,	6
Lackawanna County,	50
Clinton County,	10
Northumberland County,	6
Centre County,	10
	<hr/>
Total,	82

Respectfully Submitted,

WM. F. HAAS, *Superintendent.*

COURT DECISIONS.

During the past year there were very few cases for violation of the fish law that passed up to the upper courts. There were, however, two opinions which we annex to this which were important, as especially the one bearing upon the clarifying of waters. While the law in regard to running refuse in the streams has been in the statute books for some years, public sentiment had not reached the point that it affected the courts as to the rights of the citizens against those of the manufacturer and the miner.

Everybody from the time of the settlement of the Commonwealth had used the streams and waters of the State as the cheapest and easiest method of getting rid of all refuse and sewage. This did not amount to much when people were few and far between, but as the Commonwealth settled up and population became denser it became apparent that if the people are to have pure water there must be a stop to using the streams as sewers. At first when pressure was brought to bear upon manufacturers to stop their pollution running into the streams there was a cry went up that the Commonwealth was bent upon tying the hands of the manufacturers and putting them to so much expense as would drive the manufacturers from the State, and there is still some of that feeling in various sections.

From the earliest date of any laws on the subject the inhabitant on a stream was entitled to the water as pure and unpolluted as when it started from its source. He had the right to use it for his purposes, but must return it back to the stream in the same clear state as which he obtained it. New York is something in advance of Pennsylvania in this matter of stopping pollution, and during the past two years a very important law suit was carried on in Saratoga county where a land owner sued a paper mill for rendering the stream below the mill unfit for private use.

In the lower court the injured party gained an award of damages and an injunction. In an upper court the damages were still awarded but the injunction was refused. The case then went to the highest court in New York, and that court sustained the plaintiff and made the injunction permanent in a decision which is so important that it is reprinted here, because under the Constitution of the United States, the decision of a court in one State has due weight in the courts in another one.

Since the New York court made this opinion the Board of Health of Pennsylvania obtained an injunction in the same line against a sewage company in Chester county. These opinions are far reaching and mean that in the future the streams can no longer be made sewers to the detriment of the people living below and the public in general.

SUMMARY CONVICTIONS.

June, 1912, four men were arrested in Erie for using a device for taking fish in Lake Erie without a license. The magistrate convicted them and imposed upon them a fine of \$25.00 each, together with the confiscation of the boats and the device. The defendants' counsel took an appeal under the Act of 1905, but later discovered that that act had been declared unconstitutional. The defendants' counsel then asked the Court of Quarter Sessions for an appeal *nunc pro tunc* as if taken within five days from the date of conviction, as the law provides. On September 19, 1912, when the case came up for hearing before the court, the counsel for the Commonwealth asked that the appeal be quashed. It was shown that when the counsel had asked for the appeal, no notice had been given to the Commonwealth's attorney. At the September term the court quashed the appeal in the opinion which is given in full below:

Commonwealth of Pennsylvania,	{	In the Court of Quarter Sessions of Erie County, Penna. No. 51 Sept. Term, 1912. Appeal from Summary Conviction; and Rule to quash same.
vs.		
Charles Wagner, William Smith, Charles Smith and Edward Bolt.		

The defendants were arrested, convicted and fined by the alderman for violation of the Thirteenth Section of the Act of April 4th, 1907, P. L. 53, by using nets for the purpose of catching fish in the waters of Lake Erie without obtaining a license so to do. By the record, it appears that such conviction and sentence was on May 28, 1912.

From which sentence, the defendants on June 3, 1912, took an appeal to this court, and gave bail to answer, but without then showing cause or securing an allowance therefor from this court or a judge thereof. Later, on June 21, 1912, on defendants' petition, we made an order allowing an appeal *nunc pro tunc* as if taken within five days from the date of said conviction. The only reference to the merits of the case in said petition is as follows:

"Your petitioners further allege that they are not guilty of the charge preferred against them and upon which they were convicted as aforesaid. That there was no evidence produced at the hearing before said alderman upon which said conviction fairly could be based. That said conviction of your petitioners was wholly wrong and oppressive, and if allowed to stand would work great injustice to them."

On September 19, 1912, on motion of the Commonwealth, by the district attorney, we granted a rule to show cause why such appeal should not be quashed. And, without passing upon said rule, proceeded on same day to hear the evidence in the case. Such evidence, and also that taken before the alderman, as appears by the transcript, show that the only question in the case is one of fact as to defendants' guilt or innocence. And as to that, we are inclined to the opinion that the alderman reached a correct conclusion. But aside from that, we are clearly satisfied that the appeal was improvidently allowed and should be quashed. The defendants had a full opportunity to

present their defense before the magistrate and did so; and there was no allegation of corruption, oppression or disregard of the law. Under such circumstances, it is well settled that an appeal should not be allowed.

See *Thompson vs. Preston*, 5 Superior Court 154; *Commonwealth vs. Styers*, 15 District Reports 816, and other cases.

Where the appeal is not taken in proper time, it may be allowed *nunc pro tunc*. *Commonwealth vs. Swift Brothers*, 17 C. C. 95. But this can only be done on such ground as would have justified granting the appeal if applied for in the proper time.

Board of Health vs. Decher & Co., 14 C. C. 117.

The appeal must be taken within five days.

In *re Granahan's Appeal*, 4 Kulp 75, that is a constitutional requirement which cannot be dispensed with.

In the case at bar, the petition for an allowance recites that it was so taken; but as we read the transcript, the sentence was imposed May 28th, and the appeal taken June 3d, which would be one day too late. For a valuable collection of authorities on the question of summary convictions, appeals therefrom, etc., see *Purdon's Digest* (13th Ed.) Vol. 4, beginning on page 4473. The authorities recognize the right of the court to strike off or quash an appeal improperly allowed; especially when allowed as in this case without notice to the appellee.

And now, February 10, 1913, after argument by counsel, and upon due consideration, the rule granted to show cause why the appeal in above stated case should not be quashed, is made absolute, at the costs of the defendants.

Per Curiam,
W.

THE QUESTION OF POLLUTION.

The question of having the waters of the Commonwealth run pure and unpolluted so that public health may be preserved and fish life conserved grows in importance every day. When the first settlers landed in Pennsylvania, its streams were clear and beautiful, but gradually the practice grew up of using the streams as sewers, that being the easiest and cheapest method of getting rid of refuse. As time passed this running of refuse into the streams had so increased that the waters were rendered unfit for domestic use, and fish were driven from the streams. When at last aroused public opinion induced the Legislature to pass legislation forbidding this pollution of the streams, there was a cry went up that the State was interfering with the manufacturing interests and forcing them to expense which meant driving them from business. That the people affected by the pollution had smaller interests was one of the reasons advanced that their claims should not be considered.

The question has been considered in its various aspects, and there is no doubt that it will not be long until the running of refuse into the streams will be absolutely prohibited. The matter has never

reached a full judicial interpretation in Pennsylvania, although what decisions have been rendered have shown that the tendency of the courts is to sustain the laws.

About two years ago a suit was brought in Saratoga county, New York, against a paper mill which was running refuse into the stream.

The mill is a large one, costing more than a million dollars, and gives employment to about 500 operators. The refuse it discharged into the stream was a vile compound and the plaintiff, a lower riparian owner, won his suit, the Court granting an injunction giving the paper mill a year to put the restriction into effect. In the meantime the plaintiff was awarded some damages.

An appeal was taken from this lower court and the defendants set up the plea that they had invested large sums of money and employed a large number of employees and therefore the injunction works an injustice.

The Court of last resort in New York has recently sustained the plaintiff's case and ordered the injunction made permanent. The Court remarks "although the damage of the plaintiff may be slight as compared with the defendant's expense of abating the condition, that is not reason for reducing the injunction, for if that was followed out it would deprive the poor litigant of his little property by giving it to those already rich."

The Court also quotes from an Indiana decision which says: "In locating a plant the owners are bound to know that every riparian owner is entitled to have the waters of the stream that washes his land come to it without obstruction, diversion or corruption, and are bound to take notice of the size of the creek and capacity of the stream and determine whether they should be able to conduct their business upon such a stream without injury to their neighbors and the magnitude of their investment and their freedom from malice furnishes no reason why they should escape the consequences of their own folly." The following is the opinion of the New York Court:

STATE OF NEW YORK, }
COURT OF APPEALS. }

Robert E. Whalen, Appellant, v. The Union Bag and Paper Company, Respondent.

(Decided March 25, 1913).

Appeal from a judgment of the Appellate Division, third department, modifying and, as modified, affirming a judgment entered upon a decision of the Special Term.

Robert E. Whalen, appellant, in person.

J. S. L'Amoreaux for respondent.

Werner, J. The plaintiff is a lower riparian owner upon Kayaderosseras creek in Saratoga county, and the defendant owns and operates on this stream a pulp mill a few miles above plaintiff's land. This mill represents an investment of more than a million dollars and gives employment to 400 or 500 operatives. It discharges into the waters of the creek large quantities of a liquid effluent containing sulphurous acid, lime, sulphur, and waste material consisting of pulp wood, sawdust, slivers, knots, gums, resins and fibre. The pollution thus created, together with the discharge from other industries located along the stream and its principal tributary, has greatly diminished the purity of the water.

The plaintiff brought this action to restrain the defendant from continuing to pollute the stream. The trial court granted an injunction to take effect one year after the final affirmance of its decision upon appeal, and awarded damages at the rate of \$312 a year. The Appellate Division reversed the judgment of the Special Term upon the law and facts, unless the plaintiff should consent to a reduction of damages to the sum of \$100 a year, in which event the judgment as modified should be affirmed, and eliminated that part of the trial court's decree granting an injunction. The plaintiff thereupon stipulated for a reduction of damages, and then appealed to this court from the modified judgment. The facts found by the trial court—which do not appear to have been disturbed by the Appellate Division—establish a clear case of wrongful pollution of the stream, and need not be set forth in detail.

The plaintiff is the owner of a farm of two hundred and fifty-five acres, and the trial court has found that its use and value have been injuriously affected by the pollution of the stream caused by the defendant. The defendant conducts a business in which it has invested a large sum of money and employs great numbers of the inhabitants of the locality. We have recently gone over the law applicable to cases of this character (*Strobel v. Kerr Salt Co.*, 164 N. Y. 303; *Sammons v. City of Gloversville*, 175 id. 346), and it is unnecessary now to restate it. The majority of the learned court below reduced the damages suffered by the plaintiff to \$100 a year, and reversed that portion of the decree of the trial court which awarded an injunction. The setting aside of the injunction was apparently induced by a consideration of the great loss likely to be inflicted on the defendant by the granting of the injunction as compared with the small injury done to the plaintiff's land by that portion of the pollution which was regarded as attributable to the defendant. Such a balancing of injuries cannot be justified by the circumstances of this case. It is not safe to attempt to lay down any hard and fast rule for the guidance of courts of equity in determining when an injunction shall issue. As Judge Story said: "It is impossible to foresee all the exigencies of society which may require their aid and assistance to protect rights, or redress wrongs." (2 Story's Eq. Juris. (10th ed.) s 959b.)

One of the troublesome phases of this kind of litigation is the difficulty of deciding when an injunction shall issue in a case where the evidence clearly establishes an unlawful invasion of a plaintiff's rights, but his actual injury from the continuance of the alleged wrong will be small as compared with the great loss which will be caused by the issuance of the injunction. This appeal has been presented as though that question were involved in the case at bar, but we take a different view. Even as reduced at the Appellate Division, the damages to the plaintiff's farm amount to \$100 a year. It can hardly be said that this injury is unsubstantial, even if we should leave out of consideration the peculiarly noxious character of the pollution of which the plaintiff complains. The waste from the defendant's mill is very destructive both to vegetable and animal life and tends to deprive the waters with which it is mixed of their purifying qualities. It should be borne in mind also that there is no claim on the part of the defendant that the nuisance may be come less injurious in the future. Although the damage to the plaintiff may be slight as compared with the defendant's expense of abating the

condition, that is not a good reason for refusing an injunction. Neither courts of equity nor law can be guided by such a rule, for if followed to its logical conclusion it would deprive the poor litigant of his little property by giving it to those already rich. It is always to be remembered in such cases that "denying the injunction puts the hardship on the party in whose favor the legal right exists instead of the wrongdoer." (Pomeroy's Eq. Juris. vol. 5, §530). In speaking of the injustice which sometimes results from the balancing of injuries between parties, the learned author from whom we have just quoted, sums up the discussion by saying: "The weight of authority is against allowing a balancing of injury as a means of determining the propriety of issuing an injunction." To the same effect is the decision in *Weston Paper Co. v. Pope* (115 Ind. 394). "The fact that the appellant has expended a large sum of money in the construction of its plant and that it conducts its business in a careful manner and without malice can make no difference in its rights to the stream. Before locating the plant the owners were bound to know that every riparian proprietor is entitled to have the waters of the stream that washes his land come to it without obstruction, diversion or corruption, subject only to the reasonable use of the water, by those similarly entitled, for such domestic purposes as are inseparable from and necessary for the free use of their land; they were bound also to know the character of their proposed business, and to take notice of the size, course and capacity of the stream; and to determine for themselves at their own peril whether they should be able to conduct their business upon a stream of the size and character of Brandywine creek without injury to their neighbors; and the magnitude of their investment and their freedom from malice furnish no reason why they should escape the consequences of their own folly."

This language very aptly expresses the rule which we think should be applied to the case at bar.

The judgment of the Appellate Division, in so far as it denied the injunction, should be reversed and the judgment of the Special Term in that respect reinstated, with costs to the appellant.

Cullen, Ch. J., Gray, Willard, Bartlett, Chase, Collin and Hogan, JJ., concur.

Judgment accordingly.

REPORTS OF WARDENS.

Report of William J. Acker.

Allentown, Pa., November 30, 1913.

Hon. N. R. Buller,
Commissioner of Fisheries,
Harrisburg, Penna.

Sir:—I have the honor to submit the following report of my work and observations as State Fish Warden for the year from December 1, 1912, to November 30, 1913.

The past year has been a very busy one for me as I was not assigned to any particular section of the State owing to limited number of wardens and consequently my work has been done in nearly every part of the State, necessitating much travel and expense.

On December 1st was called to the office at Harrisburg and directed to go to Carlisle to investigate a complaint that a fish basket had been built and was being operated without a license. Served warrants on the violators and subpoenaed witnesses. At the hearing the defendants were found not guilty. On returning to the office I arrested a man with five short pike. At the hearing he was convicted on the charge of having two short pike and paid the fine of \$20.00. On the 5th of December I went to Douglassville and Pine Forge on a complaint that illegal nets were being used in Manatawney Creek. Arrested two for throw netting. I then went to Allentown and arrested three for dip netting with illegal mesh. Took one of the violators to jail, one getting away and the other proving an alibi. Investigated a complaint that dead fish were being found in the Little Lehigh and found that they came from a hatchery in that vicinity, but, the Superintendent of the hatchery informed me that it would not occur again. On the 11th of December I arrested the man who ran away from me for illegal dip netting in the Manatawney at Pine Forge. Also arrested another for dip netting. At the hearing he was found guilty and committed to jail in default of payment of fine. I confiscated three dip nets in the vicinity of Allentown. I find that the use of illegal nets is very prevalent throughout this district and ran up against some bad gangs operating them. I was successful in bringing a number of the violators to time and think that the practice will be abated to a great extent when they find out that they will not be tolerated and that the fish laws have to be abided by.

During the month of January I was detailed on pollution work and investigated several cases reported to the Department in Berks, Lackawanna, Northampton and Lehigh counties, making a full report of all cases in Lehigh county where manufacturers were running refuse into the streams. During the month of February I patrolled the Bushkill, Lehigh, Schuylkill, Hayes and Beaver Run, East and West Branch of Brandywine, Chester County, from source to Delaware line; Buck and Doe Runs; Middle Branch of Red Clay Creek, West, East and White Branch of Red Clay Creek from London Grove to Kennett Square; Big Elk Creek and West Branch of Big Elk Creek; Beaver Run, Valley Creek, Chester Creek, Pickering Creek and Valley Creek in Chester County, making report of my findings to the office in Harrisburg. During the month I made five arrests and destroyed ten dipnets. Reported on all streams in Northampton county for pollution. During the month of March I made six arrests and secured the same number of convictions. Destroyed five illegal nets. In patrolling the various streams I find that the manufacturers, in most cases, are willing to co-operate with the Department in its effort to abate the pollution and listen to any suggestions offered to remedy the nuisance and I feel, that under the present method employed it will not be long before the streams will be in much better shape than they have been for many years and the fishing restored to its former state. During the month of April I was detailed on pollution work, reporting to the Department all cases of pollution

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that came under my observation. Made several arrests for illegal fishing, &c., securing several convictions. During the month of May I patrolled Jordan Creek, Little Lehigh, Cedar Creek, Monocacy and Saucon Creeks, Susquehanna River, Yellow Breeches, Allegheny River, French Creek, Sugar Creek, North Deer Creek, and Conneaut Lake Creek. Served notices on concerns in the vicinity of Allentown, giving them thirty days to remedy or abate the pollution. Spent nearly a month in Venango County on French Creek and several other streams in the vicinity of Franklin. Patrolled French Creek from Franklin to Meadville, with the assistance of a member of the State Police. We found violations of the fish laws very numerous and broke up several bad gangs operating in this part of the State, securing several convictions. It was very hard work to get these violators for the reason that they had look-outs posted all along the creek and had signals in case any stranger should approach, thus making it almost impossible to bring them to justice, but we were successful in getting several of them for fyke nets, gill nets and illegal use of outlines. We succeeded in breaking up the worst gangs and they left for parts unknown, with the exception of those we put in jail. The State Police who assisted me rendered much valuable assistance on this trip and much credit is due him. The latter part of June I was ordered to Renova, Clinton County. Patrolled Paddy's Run, Young Woman's Creek, Drury's Run and several other streams in the vicinity. Reported to the Department a case of pollution on Young Woman's Creek by a tannery on said creek. During the month of July I made six arrests and secured six convictions, also, confiscated two minnow trap nets. Patrolled streams in the vicinity of Allentown, Hellertown, Chambersburg, York, Lockport, Williamsport, Reading and Jonestown.

During the month of August I secured thirteen convictions out of fourteen arrests for various violations of the fish laws, the amount of fines paid was \$220.00. Two of the violators were sent to jail in default of paying fine imposed. The violations consisted of seining, using outline in trout stream, illegal fish basket and catching fish with hands. Patrolled several streams and reported pollution cases to the Department.

During the month of September I secured four convictions out of five arrests, one being postponed. One of the convictions was for pollution at Lock Haven by a paper mill. The case was appealed. The case postponed was pollution by a tannery in the vicinity of Lock Haven. The other cases being illegal devices in trout stream and having short bass in possession. Most of the time was given to pollution by tanneries, notices being served on the Superintendents or Managers of all manufactories found running refuse into the streams, giving them thirty days in which to abate the pollution or take steps to remedy it. The latter part of September I patrolled the Delaware River in the vicinity of New Hope, Holland and Lambertsville, also, from Trenton, N. J., to Taylorsville and Easton to Martin's Creek. Found twenty wing-walls but no nets. Stayed around here for a few days watching for fyke netting in the Delaware and for the gang who had the wing-walls. Watched from 4 A. M. until late afternoon but did not make any arrests. Made two arrests

for pollution in the vicinity of Coudersport, the cases being postponed. Patrolled several streams in the vicinity of Ralston and Roaring Branch on Lycoming Creek, most of the pollution being done by tanneries and dye works. Inspected settling vats which had been installed by one of the manufacturers who was arrested for pollution to see if they would be satisfactory to the Department. Much of my time in October being given to the matter of pollution in the vicinity of Coudersport, Emporium, Austin, Williamsport, Lock Haven and Costello. Swore out information against several manufacturers for the pollution of streams, the hearings being set for the early part of December, with the exception of two which were extended to January, 1914. I made one arrst for having fyke net in trout stream, the violator being found guilty and in default of payment of fine was sent to jail. Patrolled Monocacy, Baldeagle, Young Woman's, Sinnemahoning Creeks and Freeman and Trout Runs and the Allegheny River.

The manufacturers, as a general rule, were willing to co-operate with the Department in its effort to clarify the streams and were always willing to listen to advice and suggestions that might be offered for the betterment of conditions. A number of the manufacturers on whom I called have gone to a great deal of expense in installing settling plants or filter plants to take care of the refuse from the plants, and others, who are in the minority, have made promises to the Department but are slow in action and these are the ones who give the Department the trouble and the only way to enforce the law is to bring suit against them. Under the present method of clearing up the streams of the Commonwealth it will not be many more years before the streams are restored to their former state of purity and there will be fishing for everybody, under the present method of planting fish from 4 to 7 inches in the streams, these fish being one year old. The fishermen throughout the State and the public in general all agree that the planting of yearling fish will bring better results than the method which was used in former years.

The following shows the number of arrests made by me during the past year, the number convicted and the amount of fines:

Arrests,	62
Convicted,	48
Fines,	\$690 00

The above report is respectfully submitted.

Very respectfully,

(Signed)

WILLIAM J. ACKER,
State Fish Warden.

Report of J. D. Sizer.

Huntingdon, Penna., November 30, 1913.

Hon. N. R. Buller,

Commissioner of Fisheries,
Harrisburg, Penna.

Sir:—I have the honor to submit my annual report for the year from December 1, 1912, to November 30, 1913.

Conditions in the territory assigned to me have improved greatly during the past year, due to a great extent to the activity of the various associations in my district which are formed for the protection of fish and fish life throughout the Commonwealth and their co-operation with the Department has greatly helped to instill a desire in the minds of the people to observe the fish laws of the State.

During the past year I made ten arrests for violations of the Fish Laws as follows:

Fishing on Sunday,	1
Illegal nets—various kinds,	3
Short Bass,	1
Gigging out of season,	3
Game fish out of season,	2
Total,	10

Of this number 9 were convicted and one dismissed.

During the year just passed I destroyed or confiscated two dip nets, three fyke nets, seven set nets, three gigs and three old fish baskets.

Have done much work during the year patrolling the streams in accordance with the Department's method and desire to clarify the streams throughout the State. Where I found a case of pollution I served notice on the manufacturer to abate the nuisance, giving them thirty to sixty days in which to install a filter plant or take care of their pollution in some other way which would be satisfactory to the Department, and in most cases they have been ready to listen to suggestions and willing to co-operate with the Department in its effort to clean up the streams and restore the fishing conditions to their former state. Several manufacturing establishments have installed costly filter plants to take care of the pollution and under the present method which the Department is following it will not be long before the fishing throughout the Commonwealth will be as good as ever and the fisherman will be able to go out and get a good day's sport and bring home a basket full of fish which will repay them for their day's sport.

During the past year I have patrolled the Juniata River, Raystown Branch, Longs Creek, Buffalo Run, Bald Eagle Creek, Spring Creek, Trout Run, Clover Creek, Dunnings and Standing Stone Creeks, Spruce Creek, Pine Creek and Aughwick Creek for illegal fishing, making several arrests and destroying many illegal nets and devices.

The following are the number of arrests made and the convictions secured:

Arrests,	10
Convictions,	9
Dismissed,	1
Fines,	\$90 00

The above is respectfully submitted.

Respectfully,

(Signed.)

J. D. SIZER,
State Fish Warden.

Report of C. R. Holland.

Beach Haven, Pa., November 30, 1913.

Hon. N. R. Buller,

Commissioner of Fisheries,

Harrisburg, Pa.

Sir:—I have the honor to submit my annual report as State Fish Warden for the year from December 1, 1912, to November 30, 1913, as follows:

During the first few months of the year just passed I was dangerously ill with pneumonia, but, on March 31st I was ordered to McCall's Ferry Dam to look after the shad fishing between the dam of the Pennsylvania Water & Power Company and the Mason and Dixon Line. I reached McCall's Ferry on the second day of April and found that no shad were being caught on account of the weather being too cold, although six shad were caught on the 22d day of March, two in the tail race and four on the York County side where most of the shad run. The shad started to come up to the dam on the 10th of April and were being caught from Peach Bottom up to the dam and were larger than the previous year, bringing thirty dollars per hundred for bucks and sixty dollars for the roe shad, the prices being 20% higher than the year previous. On the 22d day of April there were planted in the Susquehanna River at Pequea four thousand yellow perch, two years old, from the Wayne County hatchery. The fish were in fine shape, not any of them being dead or showing any signs of the long journey, they being on the road from 2 P. M., on the 21st until 9 A. M., on the 22d. Warden Eisenhart who had been working with me was taken with rheumatism and had to leave for his home. The fishermen from Maryland started to invade the locality bringing with them gill seines. I employed a boatman to assist me and we captured and destroyed 14 gill seines, some float and stake seines, among them being three new ones 165 feet long with corks eight inches in diameter and two inches thick. The river pirates make their home on the islands and ledges in the middle of the river all having guards out to give signals whenever an approach was made by any one outside of their own gang. On the fourth night they sank our boat in the deep water and after that I had to borrow boats, sometimes using force, but always paying the owner for the use of same. The people consider it a crime to loan a warden a boat or in any way help us. This handicaps us in our work as these people all have double oared boats with long poles and as they know the channel of the river it is very hard to get them with a small single oared boat and I trust the Department will secure a larger boat for next season. The shad season proved to be the best in years, they bringing the fishermen more returns for their work as the fish were much larger than in former years, but, in the end they did not have much more money than in the year prior and some of the fishermen had less owing to the fact that they spent considerable money for drink.

After returning home the latter part of June from McCall's Ferry I was taken with sciatic rheumatism and was indisposed most of the month, however, I spent some days patrolling Fishing Creek where there were a great many dead trout owing to the drought, especially

on the West Branch where for a mile there was no water. The majority of the residents of this section of the State are much pleased with the repeal of the fish basket section.

On August 12th I was ordered to go to Middleburg, Snyder County, to investigate a pollution case on the Middle Creek in the vicinity of Middleburg. The pollution was done by a tannery and I had visited this plant many times during the past three years and always received a promise that the situation would be remedied by installing a filter plant but this failed to materialize, they, however, continued to enlarge the plant and on my last visit there I found four outlets leading into the creek and all the refuse from the tannery going into the stream. I brought suit against one of the officials of the concern and at the hearing he pleaded guilty and was fined one hundred dollars and promised to install a filter plant to take care of the refuse. I might say that, as a general rule, the tanneries are co-operating with the Department in its work of cleaning up the streams of all pollution. I also visited the tannery at Millville on the 5th of September and found that a filter plant was in operation and the stream in good shape. I investigated reports that seining was being done in Fishing Creek and spent a week on that stream but found that the reports were groundless. After a week of night work on the Susquehanna River in the vicinity of Pittston and Catawissa, the weather being very cold, I landed two of the worst pirates on this branch of the river for fishing with a net in an eel wall and convicted both of them, each paying a fine of twenty dollars. In the matter of pollution I find that all, or in nearly all cases, the manufacturers are anxious to co-operate with the Department in its endeavor to clean up the streams and restock them with fish life and the fish laws are being lived up to, generally speaking, in a more sportsmanlike manner than in past years, the sportsmen favoring protection and their co-operation with the Department in the enforcement of the laws will help materially in restoring fishing conditions throughout the Commonwealth.

During the year I destroyed illegal devices as follows: 14 gill seines, 1 fyke net, 4 outlines and 18 other illegal devices consisting of float seines, stake seines, nets in wing walls of eel rack and various nets which were illegally used. I made three arrests: one for pollution, the violator being convicted and fined \$100.00, which was paid; two for having nets in eel wall, both being convicted and paying fines amounting to \$40.00.

The fishing conditions throughout my territory, according to reports and personal observations, are in better condition than for many years past and the planting of fish a year old seems to be bringing better results than the planting of fry and all the fishermen are in hearty accord with the method of the Department.

The above is respectfully submitted.

Respectfully,

C. R. HOLLAND,
State Fish Warden.

Report of Alex. MacDonald.

Erie, Pa., November 30, 1913.

Hon. N. R. Buller,

Commissioner of Fisheries,

Harrisburg, Pa.

Sir:—I respectfully submit the following report of my work for the past year:

I was appointed as regular warden on March 10th, 1913. Prior to my appointment as regular warden I was employed as fireman on the Commodore Perry on Lake Erie, also helped in placing and gathering spawn, making trips to Port Dover, Canada, to secure spawn and at different times seined Presque Isle Bay for fish for breeding purposes. Was also employed as special Fish Warden. Being familiar with the conditions as they existed along the water front I made several arrests for violation of the fish laws, report of which is given in another part of this report.

During the time I have been a regular Fish Warden, which covers the past seven months, I have patrolled Lake Erie from Ohio to New York State line, guarding all creeks, lakes and streams which came under my observation. Visited many manufacturing establishments and made inspection tours with a view of abating the pollution of the various streams and waters in my district. Was on night duty for six weeks continuous watching the State nets at Six Mile Creek which were set to catch bass for breeding purposes.

I have informed you in detail on your several visits here of my findings, suggesting remedies and improvements for the conditions existing at this port.

During my visits to the various manufacturing establishments and while patrolling the streams in my district I have explained the laws to the best of my ability.

During the year I made ten arrests for violations of the fish laws, as follows:

Pollution,	1
Spearing fish out of season,	4
Trap nets,	2
Illegal fishing,	3

Total, 10

Confiscated nets valued at \$150. The amount of fines imposed on the violators amounted to \$315.00.

The above is respectfully submitted.

Very respectfully,

ALEX. MACDONALD,
State Fish Warden.

Report of W. E. Shoemaker.

Laceyville, Pa., November 30, 1913.

Hon. N. R. Buller,
Commissioner of Fisheries,
Harrisburg, Pa.

Sir:—I have the honor to submit the following report of my work and observations for the past year.

Among the better class of people who are law-abiding and the sportsmen there is constantly growing in this section a better feeling towards the enforcement of the fish laws, due to the fact that the violators of the law are beginning to realize that arrests are not being made for the sake of the revenue that comes from the arrests, but for the purpose of having the people observe the laws and become law-abiding citizens and that they must either obey these laws or become subject to arrest. Then there is another class of people in my district who delight, it seems, in breaking the fish laws by taking the fish in any manner possible so long as they secure them and this class has no fear of a term in jail and do not respect the rights of others. These violators, in most instances, are persistent users of dynamite in the vicinity of Towanda, Pa. They usually use the dynamite in the Fall and soon after the ice goes out of the river in the Spring of the year. It is very hard for me or any stranger to get close enough to identify them when they are at work for the reason that they work in gangs of from four to ten and have scouts out to give warning at the least sign of approach of any one except some of their own people.

There seems to be great rejoicing among the fishermen in this locality since the repeal of the fish basket section. There has been no attempt made to build a fish basket since the repeal of the section, but a few are using nets in the mouth of the wing-walls. A few arrests have been made for using nets in the wing-walls and more will follow unless the practice is stopped. Sunday fishing in my district is practically unknown, not an arrest having been made for over a year. The sentiment is "No fishing on Sunday."

There is quite a tendency among those who use outlines to violate the law, insomuch that they keep the game fish caught on the lines and especially is this true of the foreign element who resent any interference from any one. On August 24th I had a little trouble with five of them and had to use force before I could go on with my work.

There have been very few complaints this season relative to spear-fishing, there being only two arrests made and two complaints of wall-eyed pike being speared. Generally speaking, the people of my district are very careful when using the spear and endeavor to abide by the law as much as possible.

I have served eleven pollution notices during the past year and in most cases the manufacturers have been willing to comply with the law and abate the pollution and have started work at once to put in tanks to take care of the pollution and prevent it from getting into the streams. The Elk Tanning Company who operate a tannery at Tunkhannock, Pa., have installed a filter plant which seems to be doing the work required by the Department. Before the filter plant was installed, below the point where the sewer empties into the

river, no fish life of any kind could be seen for considerable distance. Since the plant has been installed great numbers of minnows and small mouth bass can be seen along the shore below the sewer, which is very encouraging. I made five arrests for pollution but only one of the five was prosecuted, the other four being employees of the Gaffney Wood Product Company.

A detachment of State Police from Troop B, of Wyoming, Pa., have given very efficient service on numerous occasions in bringing the violators of the law to justice.

It is very difficult to properly patrol my district with the limited amount of funds available for expenses and the large territory to which I am assigned.

I have made twenty-nine arrests during the past year, securing 25 convictions; four of the arrests being employees of a company were not prosecuted. The amount of fines collected amounted to \$350.00.

The above is respectfully submitted.

Very respectfully,

W. E. SHOEMAKER,
State Fish Warden.

Report of J. P. Albert.

Hon. N. R. Buller,
Commissioner of Fisheries,
Harrisburg, Pa.

Sir:—I have the honor to submit my annual report as State Fish Warden of the Northwestern District, comprising Warren, Erie, Crawford, Forest, Venango, Mercer, and Clarion Counties for the year ending November 30th, 1913.

I made twenty arrests in my District during the year just past, among them being violations as follows:

Explosives,	1
Gigging out of season,	5
Game fish out of season,	7
Fishing with illegal device,	3
Brook trout out of season,	1
Pollution,	3
Total,	20

I have patrolled along the various streams, rivers and lakes in my district and have found that fishing in the Allegheny River and its tributaries, also the lakes and streams, is better this year than it has been for several years. Trout fishing has never been known to be as good as this year, both as to the large number of fish caught and the large size of the fish. The fruits of planting trout ranging in size from 4 to 5½ inches instead of the fry or fingerlings has shown itself this year and all the sportsmen of my district are very well pleased with the new method adopted.

One of the greatest problems the Department has to contend with is the pollution of the streams. In my district I have to contend with tanneries, oil refineries, thousands of oil wells, chemical mills of various kinds, paper and saw mills. The pollution from the saw mills is almost a thing of the past with exception of some remote spot in the district where the saw mill gets in the mountain district on a trout stream. The large manufacturers, as a general rule, are very anxious to co-operate with the Department in bringing about the purification of the streams. The Broken Straw Creek being a good example of what can be done. This stream was one of the worst polluted streams in my district, being in very bad condition from Corry to its mouth, a distance of twenty-four (24) miles. This stream in past years was almost destitute of fish life, being poisoned with the black and dirty refuse from the tanneries, but, through the efforts of the State Officials, the stream has been purified and made a good fishing ground from Irvineton to Garland, after the State Fisheries Department had contributed a large number of young fish and today it is one of the finest fishing streams in this part of the State. Some of the largest catches made this year were made in this stream. I have served several pollution notices on the various industries located along the streams in my district. Have also investigated numerous complaints of violations of the fish laws and in most cases found that they did not amount to anything, the parties making the complaint being ignorant of the law themselves.

The spearing of fish is, I find while patrolling the streams, very destructive to fish life. Have seen hundreds of fish, both game and food, that have been struck with a spear floating down the streams, which accounts to some extent to the number of dead fish seen in the creeks and eddies. Some of the old fishermen claim that they cannot tell a salmon from a sucker when they are travelling fast through the water and the game fish that are struck, in nearly every case, are shaken from the spear and left to drift when the fisherman finds out his mistake.

Owing to the small amount of funds available and the large district assigned it is impossible to patrol the entire district in the manner it should be and do efficient work.

The above is respectfully submitted.

Very respectfully,

J. P. ALBERT,
State Fish Warden.

Report of F. B. Whiteman.

Beaver, Penna., November 30, 1913.

Hon. N. R. Buller,
Commissioner of Fisheries,
Harrisburg, Pa.

Sir:—I have the honor to herewith submit report of my work as State Fish Warden for the year from December 1, 1912, to November 30, 1913, as follows:

Conditions throughout my district which comprises Beaver, Butler, Armstrong, Allegheny, Indiana and Lawrence Counties gave me much trouble the past year. The violators seemed to be working over time and they kept me very busy. I broke up several bad gangs, at times being compelled to use force to do so, in the district assigned me and several times my life was threatened. The various organized Protective Associations help considerably to enforce the fish laws and heartily co-operate with the Department in its effort to bring the violators of the law to justice and these associations should be encouraged in their work.

During the year I destroyed many illegal nets and devices used by the violators and in many cases arrested the guilty ones. I made twenty-seven arrests as follows:

Gigging,	16
Seining on Sunday,	6
Explosives,	3
Outline on Sunday,	1
Shooting fish,	1
Total,	27

During the past year I patrolled various rivers and streams in my district investigating reports of violations. Some of the waters patrolled were the Ohio and Allegheny Rivers; Beaver River, from Rochester to Ellwood City; Raccoon Creek, from Vanport four miles up stream; Mahoning Creek; Shenango River, from Pulaski to Newcastle; West Branch of the Susquehanna River; Clarion River, from Foxburg to Callensburg; Monongahela River, Pittsburg to Glassport; Raystown Branch of the Juniata River and several smaller streams. I found the pollution on the Ohio and Allegheny Rivers very bad and investigated same very thoroughly reporting to the office my findings.

About the middle of August my home was burned down and I lost practically all my belongings, including my records of my work for the year, therefore, my report is necessarily shortened. On the first of October I was granted leave of absence for sixty days in order that I might build myself and family a new home, this to be without pay, as I did not think I could give my work the proper attention and at the same time build a home for myself and family.

Following is the number of arrests, convictions and fines collected during the year:

Arrests,	27
Convictions,	18
Discharged,	3
Appealed,	6
Fines,	\$370 00

The above is respectfully submitted.

Respectfully,

(Signed)

F. B. WHITEMAN,
State Fish Warden.

Report of J. E. Conklin.

Bradford, Pa., November 30, 1913.

Hon. N. R. Buller,

Commissioner of Fisheries,

Harrisburg, Pa.

Sir:—I have the honor to submit the following report for the year ending November 30th, 1913. The District assigned me includes McKean, Potter, Clinton, Cameron, Elk, Tioga, Jefferson and Clearfield Counties, which is almost entirely a trout territory. While I have been unable to cover the entire district, I have tried to patrol the streams where the fish laws are mostly violated.

The number of arrests made by me as State Fish Warden were four, as follows:

Dynamiting,	1
Snaring trout,	2
Taking fish with hands,	1

The violators being, in most cases, old offenders.

Much of my time was given to the pollution of the streams, serving notices on the different Superintendents of plants running refuse into the streams, as follows:

Tanneries,	30
Chemical factories,	23
Powder mills,	5
Saw mills,	5
Oil refineries,	2
Creosoting plants,	1
Glass works,	1
Total,	67

After the time lapsed called on the different manufacturers to see what provisions, if any, had been made to abate the pollution and again served notices for a shorter period. The large majority of the chemical factories had made some provision to abate the pollution coming from their factories. The Elk Tanning Company have plans to put in filters or disposal plants at all their tanneries, which is the result of the Department keeping after them. In July, with Warden Acker, took samples of pollution from all the different industries along Pine Creek and Sinnamahoning waters. Tested same on fish and found that the time consumed for killing the fish was from twenty seconds to eight minutes. Samples of the pollution was shipped to the office at Harrisburg for further tests. My observations are, that while all the Superintendents and Managers of the different manufacturing establishments along the various streams of the District treated me very courteously and always expressed a willingness to comply with the law, yet where they have made provisions for keeping the refuse out of the streams, they have not gone far enough, and in many places where they built on the streams years ago, to get rid of their refuse, they have a very limited space to take care of it. While they are keeping a large percentage out of the streams, there is still great room for improvement and this will only come about

by keeping after them. The public, in many cases, do not realize the vast amount of work that has been done by the Department of Fisheries in trying to clean up the streams and restore the fishing conditions and is, therefore, very impatient.

The method of stocking the streams of the Commonwealth with yearling trout, from 4 to 5½ inches long, instead of fry or fingerlings meets with the hearty approval of all the sportsmen in this district and great results are expected in the course of a year or two.

The above is respectfully submitted.

Very respectfully yours,

J. E. CONKLIN,

State Fish Warden.

Report of Charles F. Gehman.

Collegeville, Pa., November 30, 1913.

Hon. N. R. Buller,

Commissioner of Fisheries,

Harrisburg, Pa.

Sir:—I have the honor to submit the following report of my work and observations for the year just closed:

Conditions in my District, Delaware, Philadelphia, Chester, Montgomery, Bucks, Lehigh and Northampton Counties have improved materially the past year. Reports of illegal fishing have been fewer and of a less serious character than the previous year. This is largely due to the organized efforts of the various Protective Associations scattered throughout my district and to the increased activity of the special wardens and constables.

During the year I made twenty-five arrests for violations of the fish laws, as follows:

Gigging out of season,	1
Shooting fish,	1
Short bass,	2
Illegal number of hand lines,	2
Illegal nets—various kinds,	12
Fishing on Sunday,	2
Fishing with floats,	2
Pollution,	3
Total,	25

Of this number twenty-two were convicted and three acquitted.

The following illegal devices were destroyed: Three stir nets, three fyke nets and two dip nets. In addition to the above I still have a number of illegal nets in my possession which are being held until cases are finally determined.

During the year I have investigated many complaints of pollution, both in my district and in other parts of the State, with the result that three successful prosecutions were brought, most notable among

them being the one at North Wales, Montgomery County, where a considerable portion of the head waters of the Wissahickon Creek were depleted of fish life. This offense was traced to the Union Chemical Company of North Wales, who were successfully prosecuted and this Company have since abated the pollution. Two prosecutions were brought in Bucks County for polluting the head-waters of Neshaminy Creek, both being successful and the pollution abated.

Of the more important investigations carried on by me under the direction of the Department, the investigations conducted on the Allegheny River was of the greatest importance. Between the 8th and 13th of September thousands of fish were killed in this river. Bass in large numbers, together with thousands of the commoner species of fish, were destroyed and it is doubtful if any escaped destruction in that section of the river. The investigation showed that the destruction was due to the abnormally high acidity of the mine water brought on by a protracted drought; this water, high in acid, was brought down the Kiskiminetas River by a slight rise and when it reached the Allegheny River the destruction of the fish followed.

My observations during the past year have been as follows:

My work on the Delaware River above Trenton Falls has not been satisfactory to myself. I cannot do justice to this beautiful river with the equipment at hand. I would respectfully suggest that the Department place at my disposal a small power boat suitable for shallow water work. I am positive that such a boat would more than pay for itself during the first year and it would facilitate the work.

The bass season has been successful from the angler's point of view in my district, good catches have been made and reported from all sections. This is especially true of the Perkiomen and its tributaries in spite of the fact it is the hardest fished water-shed in the State. Bass fishing has been better in the Schuylkill River this season than for a number of years, good catches having been made between Pottstown and Norristown.

The large ice dams in Hosensack Creek located at Palm and Hosensack have furnished royal sport to the anglers of upper Montgomery and lower Lehigh Counties. Large mouth bass have been taken in large numbers in these waters, fish weighing from four to six pounds are common. This is remarkable when we take into consideration that the first large mouth bass were planted in these waters about five years ago. Yellow perch are on the increase in the above mentioned dams and a few are being taken in the Perkiomen. Bass fishing in the upper Delaware has been very good the past season. Good catches of trout were reported from all trout waters in my district and the sportsmen seemed to be of the one opinion that the size of the trout now planted, from 4 to 5½ inches long, yearlings, instead of fingerling or fry, will bring better results and all look forward to good fishing in a few years. An increased interest is being taken in carp fishing throughout my district, many anglers fish for them when water conditions make bass fishing uncertain.

A summary of arrests and disposition of cases follows:

Arrests,	25
Convictions,	22
Acquittals,	3

Fines imposed,	\$700 00
Fines paid,	\$520 00
Appeals,	7

The above is respectfully submitted.

Respectfully,

CHAS. F. GEHMAN,

State Fish Warden.



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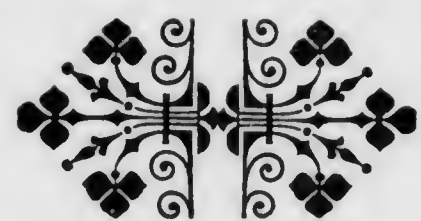
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